

APR 28 1950

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Mining

CONGRESS JOURNAL



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APRIL
1952



5-7 — COAL CONVENTION — *Cincinnati, Ohio*

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Washed iron ore is stacked at rate of 600 long tons per hour by this 570 ft. track-mounted trailer belt conveyor (fed by fixed belt conveyor) and Link-Belt 115 ft. radius revolving, self-propelled stacker, which can make storage pile 42 ft. high.

Rely on one source... one responsibility for the best in belt conveyors

LINK-BELT engineering experience plus quality components combine to cut handling costs

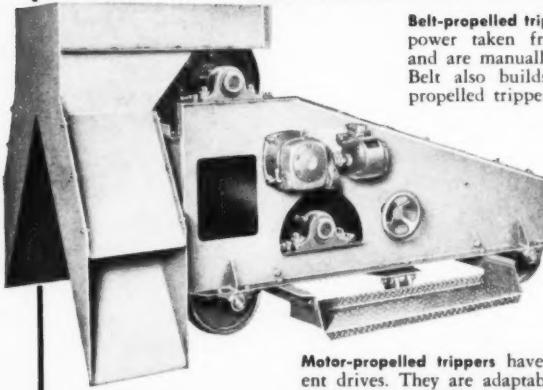
WETHER you must move a few tons a day or several thousand tons per hour . . . whether the haul is measured in feet or miles—you'll find the answer in belt conveyors at Link-Belt.

Here's a nation-wide engineering organization that will follow through from start to finish—the designing, manufacturing, erecting of conveying equipment. And nowhere can you match Link-Belt's combination of vast application experience . . . complete line of quality components . . . expert coordination of related equipment.

Get all the facts from the Link-Belt office near you. Link-Belt engineers are glad to work with you and your consultants—help you get the finest in belt conveyors.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 46, Atlanta, Houston 1, Minneapolis 5, Duluth 2, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

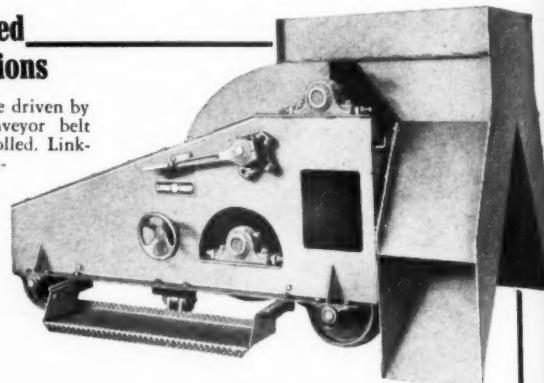
LINK-BELT Trippers offer controlled distribution under all conditions



Belt-propelled trippers are driven by power taken from conveyor belt and are manually controlled. Link-Belt also builds winch-propelled trippers.

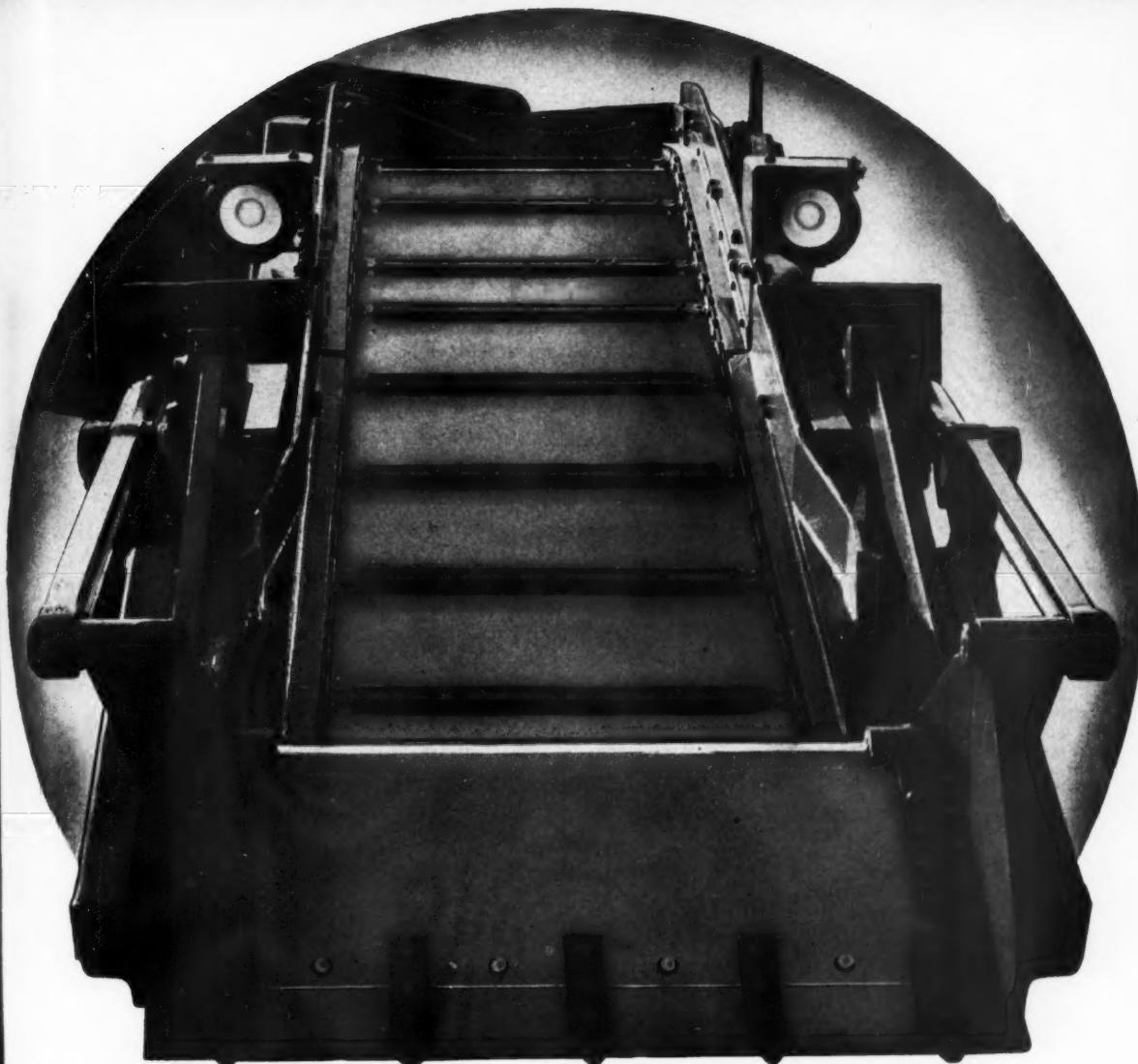
Motor-propelled trippers have independent drives. They are adaptable to automatic operation and control.

12-685-B



LINK-BELT
THE ENGINEERS OF QUALITY
LINK-BELT COMPANY

BELT CONVEYOR EQUIPMENT



No Other Loader Can Match Its Efficiency in All Classes of Material!

Today, more than ever, no coal mine trying to reduce costs by mechanization can afford to overlook the versatile loading of the powerful Whaley "Automat."

You can save on equipment investment, maintenance and man-hours when your loader is equally effective in loading coal, rock, slate or ore. The

unmatched flexibility of the Whaley "Automat" is due, for the most part, to its exclusive automatic shovel action loading head. The simplest and most effective gathering mechanism is the shovel.

But, back of the shovel is a first class machine, well known by reputation, for staying on the job day-in and day-out, loading consistently in all classes of material at the lowest possible cost!

For track or off track loading, investigate the versatile Whaley "Automat" now! Write to us today. Myers-Whaley Co., Knoxville, Tenn.

Note: The Whaley "Automat" is Now Available Either Track Mounted or Crawler Mounted.



MYERS-WHALEY COMPANY

MECHANICAL LOADERS EXCLUSIVELY SINCE 1908

CARDOX-HARDSOCG
Underground
AUGERMINER

gets out coal
 at a profit you'd
 otherwise leave in
 the ground...

AugerMiner with coring-type cutterhead. ▶
 Height and angle of the drill are quickly
 adjusted to bring out coal, free of impur-
 ities from roof and bottom.

IF you have coal that's presently unprofitable to mine because of poor roof conditions and excessive timbering costs, a CARDOX-HARDSOCG Underground AugerMiner can restore profitable production.

With an AugerMiner you can produce coal at a cost that's usually far less than for your conventional method of mining. This recovery is doubly profitable because it calls for little or no development expense. The coal you get is *all* coal, free of impurities from roof or bottom.

An AugerMiner drills into thin or hard-to-reach seams while men remain safely in areas where the roof can be supported at reasonable

new

start here



cost. It teams up perfectly with a portable conveyor for simple, low-cost mechanized mining.

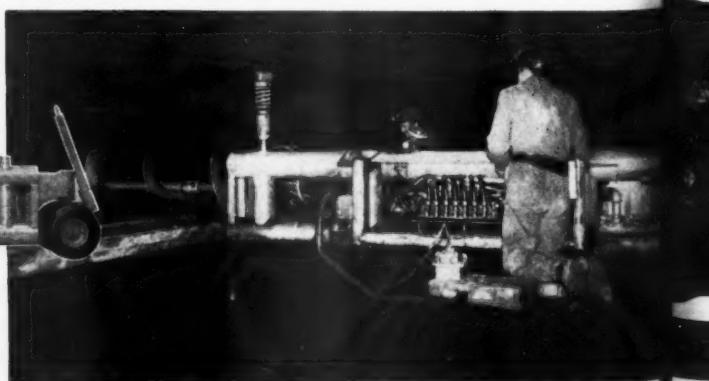
The AugerMiner, furnished with a 25-hp motor, drills holes up to 30" in diameter. If profile length is extended as required in easily-available 6' sections. Other AugerMiners with motor capacities to handle augers up to 42" in diameter will be announced in the near future.

CARDOX-HARDSOCG Augerminers are distributing renewed profits in many mines. If you're in specific terms what an AugerMiner can do in your particular operations. Or write for new bulletin.

Operator's side of AugerMiner. Built-in hy-
 draulic roof jacks are controlled by operator.
 Auger pulling device makes removal
 of augers from hole simple and fast.



Underground AugerMiner. Note removable
 rubber tired trammimg gear and low over-
 all height.



profits

and here

AIRDOX
CARDOX
NON-EXPLOSIVE
MINING METHODS

AIRDOX and CARDOX
breakdown and heave coal from the face
with minimum shattering and dust.

portable
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h a 25
urn uncertainties and waste into certainties
meter. *Profits* all along the line. The list of users
easily—have found this out is growing every month.
h mot
RDOX has shown conclusively that it en-
in dia-
production at lower cost per ton than other
ods—and fixes that cost at known levels.
ers are
DOX has a record extending over many
mines for producing more desirable, more market-
l to sell coal at continuous low cost.
inner c
RDOX uses the non-shattering force of com-
Or write

pressed air at the back of the drill hole; CARDOX
the powerful expansion of released carbon
dioxide. Coal is heaved out without the violent
impact of explosives.

Add up the results: Both methods make mining
safer—permit on-shift shooting in many mines
—eliminate fire and explosions resulting from
shooting . . . They protect roof structure . . . The
percentage of fines is less . . . The coal is easier
to clean—washing losses are minimized . . .
Loading efficiency is increased.

Which is Better for You—

AIRDOX or CARDOX?

This can best be answered by a meeting of our
engineers and yours. It's the first step in the
biggest improvement in methods your mine can
make. Write and we'll arrange it.

Typical fall of coal broken with Airdox.

AMERICAN AIRDOX COMPANY • 300 N. CLARK ST., CHICAGO 1, ILLINOIS



In Mines and Quarries

"EUCS"

**HAUL MORE TONS
AT LESS COST**

Built for tough off-the-highway hauling, Rear-Dump and Bottom-Dump "Eucs" have stepped up production and cut hauling costs on hundreds of open pit mining and quarry operations.

Euclids have proved their efficiency and long life in hauling a wide variety of materials . . . coal, ore, rock, overburden and other heavy excavation. Bottom-Dumps are powered by diesel engines of 190 to 300 h.p. . . . loaded speeds up to 34.4 m.p.h. . . . available in 20 to 40-ton capacities. Rear-Dump "Eucs" have travel speeds up to 36.3 m.p.h. . . . powered by diesel engines of 125 to 400 h.p. . . . range in capacity from 10 to 34 tons.

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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● From the days of hand loading direct into small mine cars Jeffrey Locomotives have been in constant use as power units under widely divergent conditions.

Today wherever coal haulage is maintained by rail Jeffrey provides modern locomotives to meet every haulage condition.

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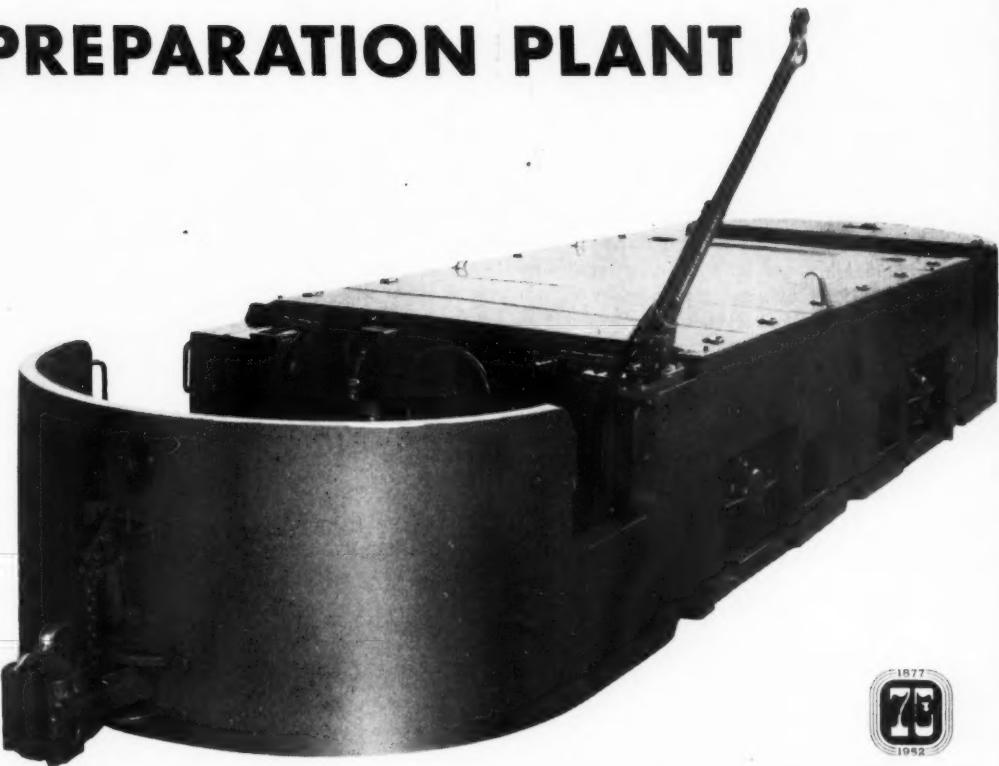
Consult a Jeffrey Engineer on your transportation system for greater production and lower per ton costs.

Y 3 8 4 **LOCOMOTIVES**

DEPENDABLE HAULAGE

FROM FACE TO

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Established 1877

Complete line of
Material Handling,
Processing and
Mining Equipment

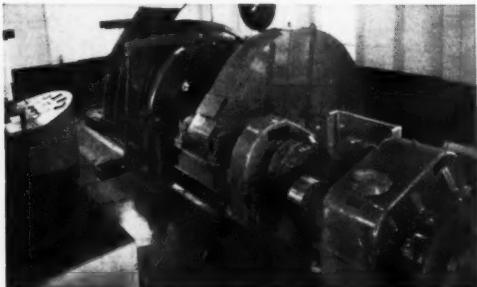
Reliable EQUIPMENT IS AS VITAL TO THE COAL INDUSTRY AS COAL ITSELF...

HOLMES MINING EQUIPMENT

The hundreds of mines using equipment engineered and built by Holmes, is a testimonial that they have been doing one thing well since 1872. Use this specialized experience to obtain the most advanced design, the best of materials and the latest methods of manufacture. Take advantage of this background of creative engineering and long-standing reputation for sturdy construction that assures efficient, dependable performance at lower over-all costs. Call a Holmes Mine Equipment engineer for consultation in the planning and development of your requirements. There is no obligation.

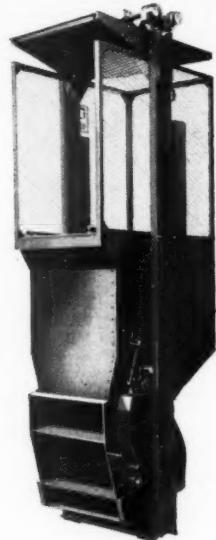


ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS

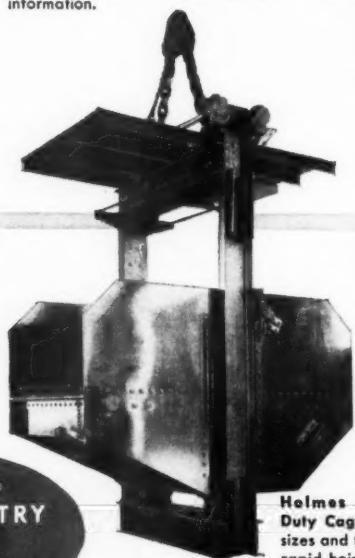


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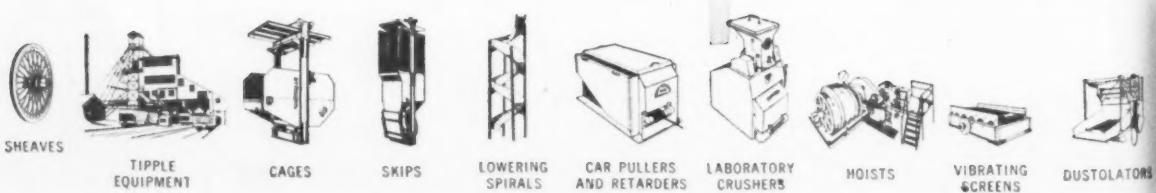
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THE INDUSTRY
FOR
80 YEARS



Holmes Combination Drop Bottom Mine Skip and Man Cages- in all sizes and types. Ask for complete information.



Holmes Heavy-Duty Cages in all sizes and types for rapid hoisting and low maintenance. Ask for complete information.



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AND RETARDERS



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... two 75 hp motors, 48" gauge. Hydraulic braking and steering. Automatic headlight protection. Speed control and rated drawbar pull.



THIS
Goodman
LOCOMOTIVE
in a single or
tandem operation
will put "GO" in your
haulage system

As a single unit for initial and intermediate haulage, in tandem hookup as length of hauls increase, this locomotive gives the performance it takes to keep pace with mine expansion.

Whether you eventually buy two or twenty, you will find them as alike as peas in a pod. With ANY TWO hooked in tandem, there is full operating control from either cab. Plenty of room, and safety too, for the motorman and trip rider.

Heavy-
ges in all
types for
towing and
maintenance
comple-
on.

At the 1952 Coal Show in Cincinnati, May 5-6-7, you are cordially invited to visit Goodman headquarters in the Netherland Plaza Hotel.

More than enough power for the job today
Fully adequate for the bigger job tomorrow

Goodman MANUFACTURING COMPANY
HALSTED STREET at 48th • CHICAGO 9, ILLINOIS

CUTTING MACHINES • CONVEYORS • LOADERS • SHUTTLE CARS • LOCOMOTIVES

WIRE ROPE



This is the most economical rope we've ever made for mining

ROEBLING is the best known name in wire rope. That's partly because we were the first wire rope maker in America. But more than that, we've always led in developing better wire and better rope for every purpose.

Today's Roebling Preformed "Blue Center" Steel Wire Rope is the miners' best choice for efficiency

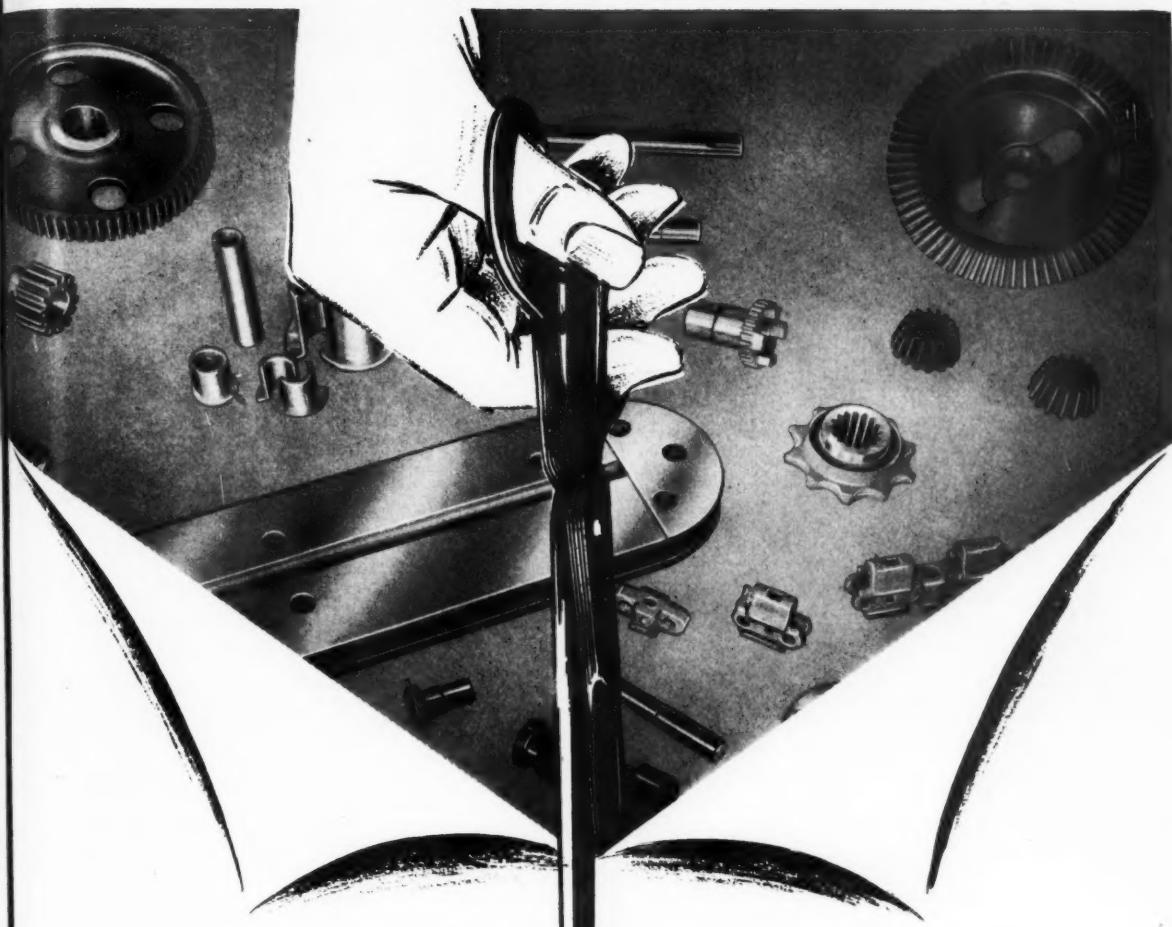
and long life. This rope has *extra* resistance to crushing and abrasion . . . stands up under rough going. It saves you time and cuts costs.

There's a Roebling wire rope of the right specification for top service on any job. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, N. J.

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CUT YOUR COSTS WITH TRACY PARTS

ALL TRACY parts are a combination of the right materials, expert workmanship and years of experience. Our cutter chain and bars are ideal for continuous low-cost cutting under all conditions because they are engineered for long wear and top performance. Similarly, all TRACY products will guarantee smoother operations with lower costs and higher output.

Parts by Tracy

MANUFACTURED BY BERTRAND P. TRACY CO. PITTSBURGH, PENNA.

BRANCHES IN HARLAN, KENTUCKY - DUQUOIN, ILLINOIS - SMITHERS, WEST VIRGINIA
MILL AND MINE SUPPLY COMPANY, BIRMINGHAM, ALABAMA

The SINKER LEG with

EXCLUSIVE

*Roll Type Throttle
Control*

EXCLUSIVE

*Push Button Air
Bleeder Valve*

EXCLUSIVE

*Cylinder Mounting for
Positive Safety . . .
Endless Service Life*



Here's real savings in labor . . . man hours . . . and drilling costs . . . and 45% more drilling footage by actual tests!

The miner can carry the entire setup—Thor Sinker and Thor Leg—into the smallest tunnel or closest corner, set it up in an instant, start the hole . . . and then let Thor do the work! All he does is control the *constant pressure* feed by operating two simple throttles—the *only automatic controls in leg operation!*

Think of the savings . . . both in operating costs and air consumption. With carbide bits the Thor Leg can replace drifters—and heavy mountings on scores of heavy duty operations . . . can drift in tunnels where drifters won't fit. Write today for catalog data.

INDEPENDENT PNEUMATIC TOOL COMPANY

AURORA, ILLINOIS

Export Division: 330 West 42nd Street, New York 18, N. Y.

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Detroit	Houston	Los Angeles	Milwaukee	New York	Philadelphia	
Pittsburgh	St. Louis	St. Paul		Salt Lake City	Seattle	
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FULLY AUTOMATIC—A quick, easy setup—just start the hole—set the leg at any angle between 30 and 45 degrees. . . the leg does all the lifting—all the constant pressure feeding . . . control the feed with a turn of the wrist!

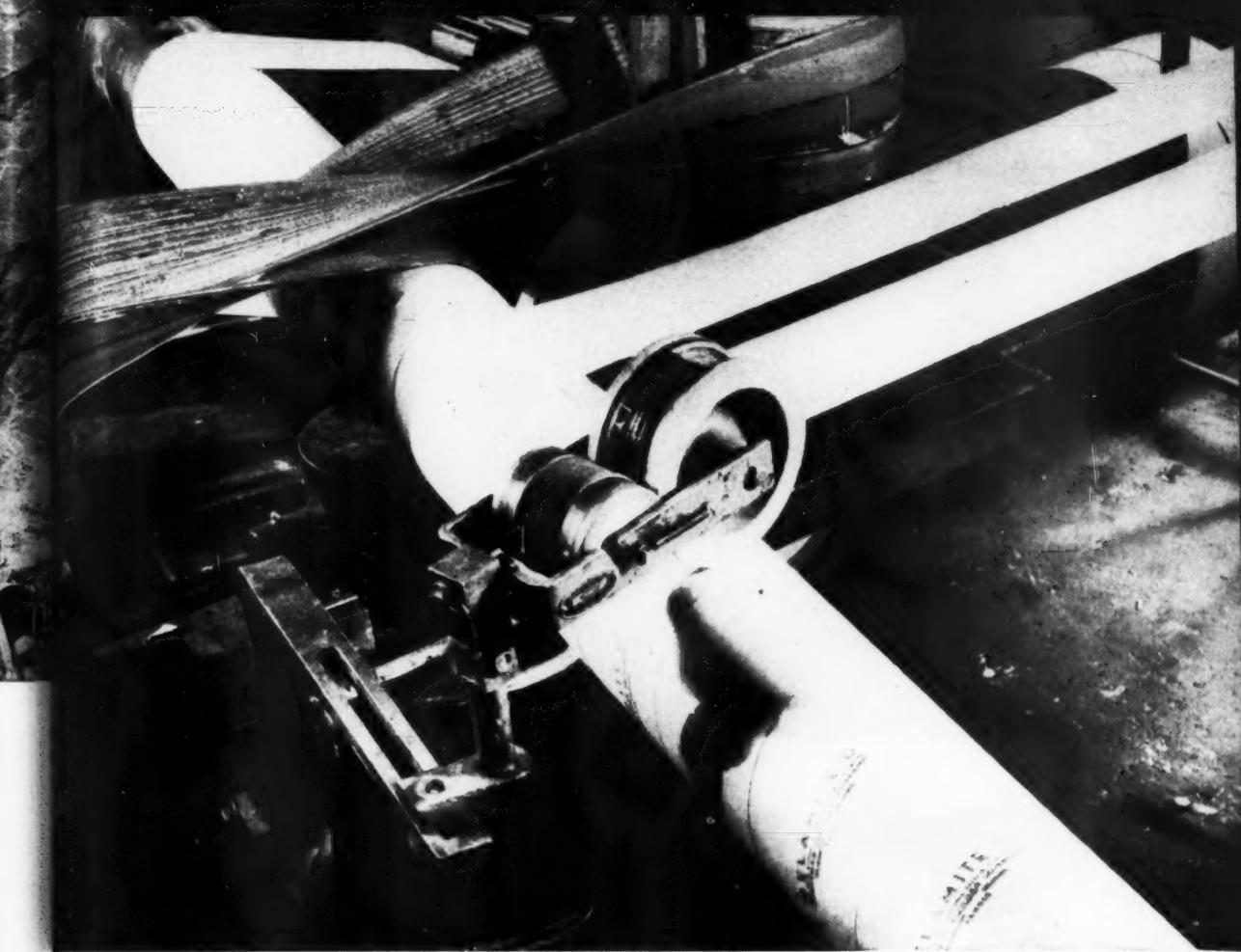
Thor

PORTABLE POWER

TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

PROGRESS IN EXPLOSIVES . . .



DYNAMITE, KING-SIZE



Did you know that dynamite comes in cartridges this big? Hercules pioneered in developing these larger cartridges which make for efficient blasting in large-scale coal striping, open-pit mining, and quarrying operations.

These king-size cartridges range in diameter from 1 3/4 in. to 11 in. and weigh as much as 60 lbs. when filled. Spiral-wrapped in Hercules' own plants, they offer advantages in rigidity and smoothness. Other advantages: They are essentially their own shipping containers, are easier to handle and use, and can be stacked like cordwood.

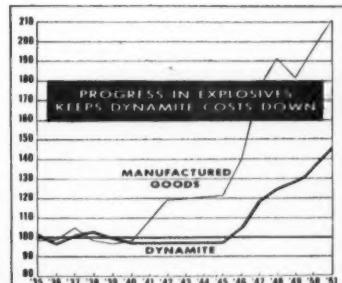


Chart shows relative stability of dynamite prices since 1935, as compared with prices of other manufactured goods. 1935-39 values=100.

► **HERCULES POWDER COMPANY**

INCORPORATED

Explosives Department, 922 King St., Wilmington 99, Del.

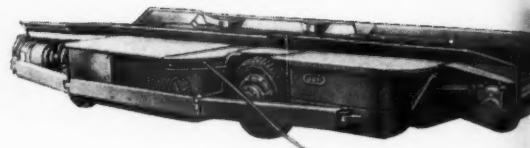
XRS2-3

Here's your Field-Proved, Mobil



20-BU-I LOADER

Only 24" high, yet can load up to 8 tons per minute. Fast trammimg, easily maneuverable, features independently driven conveyor and gathering head. While a shuttle car is away, the gathering arms can provide a fully-loaded conveyor ready for quick loading when the car returns. Also permits continued loading even if the gathering arms are momentarily stalled with hard digging.



8-SC SHUTTLE CAR

Features 4-wheel positive drive, 4-wheel hydraulic steering, tapered-end design for minimum turning clearance, height of only 26" and level capacity of 2 tons. Separate motors for traction, conveyor drive, and hydraulic pump drive. Disc-type brakes on all wheels, hydraulic cable reel and hydraulically-adjustable elevating discharge.

and here's the rest
of the **JOY**
LOW VEIN TEAM

SULMET CARBIDE BITS

Joy Sulmet Bits, tipped with sintered tungsten carbide inserts, are made in a variety of types and different degrees of hardness to meet any mining condition. They fit any cutter, and by actual case records, out-perform every other bit on the market.





The JOY 12-RB CUTTER

**FAST TRAMMING, FAST CUTTING
for HIGH PRODUCTION**

Have you seen this film?

**"TRACKLESS
MINING
IN COAL"**

16mm—Sound and Full Color—45 Minutes
Write for a FREE Showing

Address our Film Booking Office

Meet the JOY 12-RB, above . . . the cutter member of the *only* mechanized mining team designed specifically for high-capacity production in very low vein coal. With the Joy 20-BU-1 Loader and 8-SC Shuttle Car, it assures field-proved flexibility and economy never before available to mines operating in extremely thin seams.

The 12-RB is a highly mobile and maneuverable rubber-tired cutting machine only 26" high, supplied either as a top or bottom cutter, and readily convertible. Its high tramping speed and variable hydraulic feed (which provides a greater cutting feed speed than shortwall machines) together permit cutting more places per shift. Bar tilt, roll and lift are hydraulically controlled, and steering is also hydraulic, with a separate motor serving the hydraulic pump.

Consult a Joy Engineer

W&D CL4001

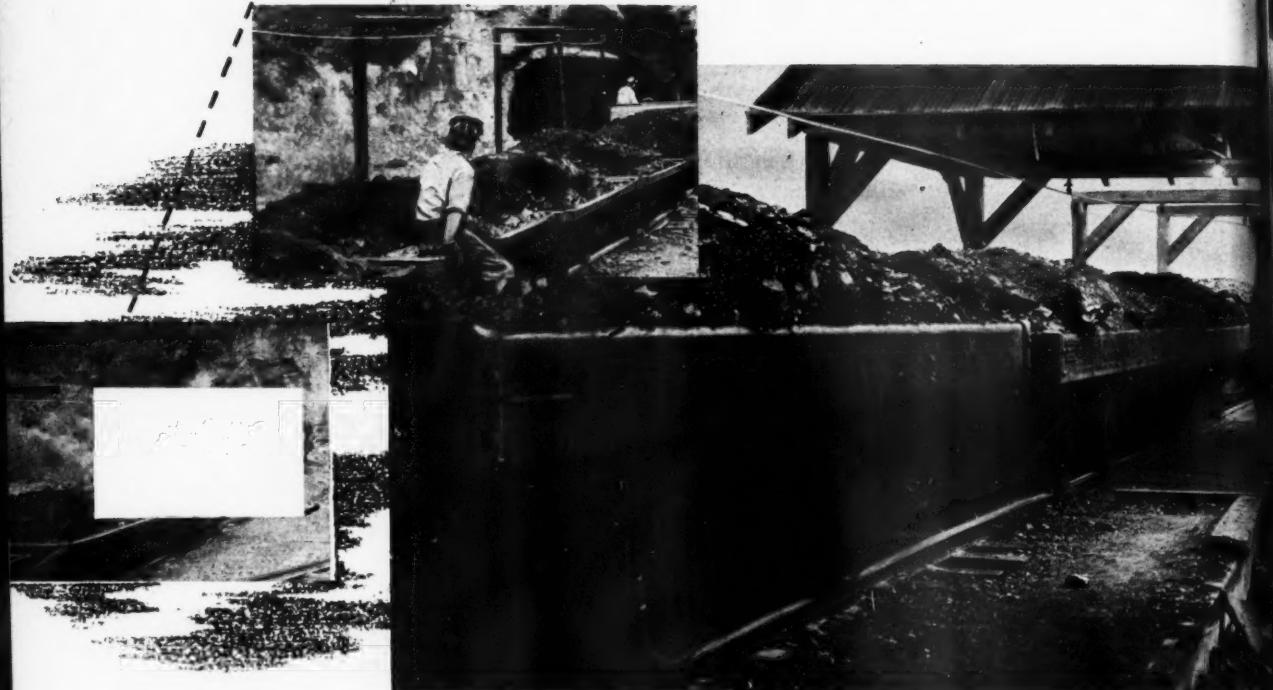


JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

HOW TO "MOVE" YOUR MINE 1 MILE 'CLOSER' TO THE UNLOADING STATION



A.C.F. Drop Bottom Mine Cars unload so fast it's the same as cutting 1 mile off your hauling time!

75 seconds...that's the incredibly short time it takes to completely unload a trip of 15 Q.C.F. Drop Bottom Mine Cars and have them ready to return for more coal! Compare that with the usual 5, 10 and even 15 minute unloading time for ordinary cars, and you can instantly see the remarkable savings. In many mines, these savings add up to an extra 'round trip each day...

a substantial increase in production!

The secret is in the fully automatic operation. As the trip passes over the unloading point, each Q.C.F. Drop Bottom Mine Car unloads itself, then closes and latches its own doors. The savings in time actually amount to the same as picking up your whole mine and moving it at least one mile closer to the unloading station!

Next time you plan to buy new haulage equipment, find out how much 'bonus tonnage' Q.C.F. Drop Bottom Mine Cars can give. Your nearby Q.C.F. Representative has the facts. American Car and Foundry Company, New York • Chicago • St. Louis • Cleveland • Philadelphia • Washington • Huntington, W. Va. • San Francisco • Berwick, Pa.

a.c.f. MINE CARS
for Constant Haulage



"You mean a

loose slot stick

stopped that

whole train?"

Certainly—but the report will say: "Motor failure was caused by a ground in the armature coil, 1 inch in from the end of the slot, pinion end." Overlooked in the report is the tiny slot stick, or wedge, which was made a couple of thousandths off size, or which was off a hair's breadth because of shrinkage. From it, coil vibration developed. Soon, a ground—motor failure—and the train couldn't make the grade. All over the world—in mines, in industry, in electric utilities—production trains can't make the grade because of "minor" failures deep in the bowels of motors and generators. National has demonstrated that the frequency of such "minor" failures can be drastically reduced. How? By insisting that every component which National supplies or installs must fit the particular job *that* motor or generator has to do—by refusing to be bound by standards set at some time in the obsolete past to fit general usage. We invite you to check the National record. We're proud of it.

*Wherever you are
our nearby Field
engineer is available*



NATIONAL ELECTRIC COIL COMPANY

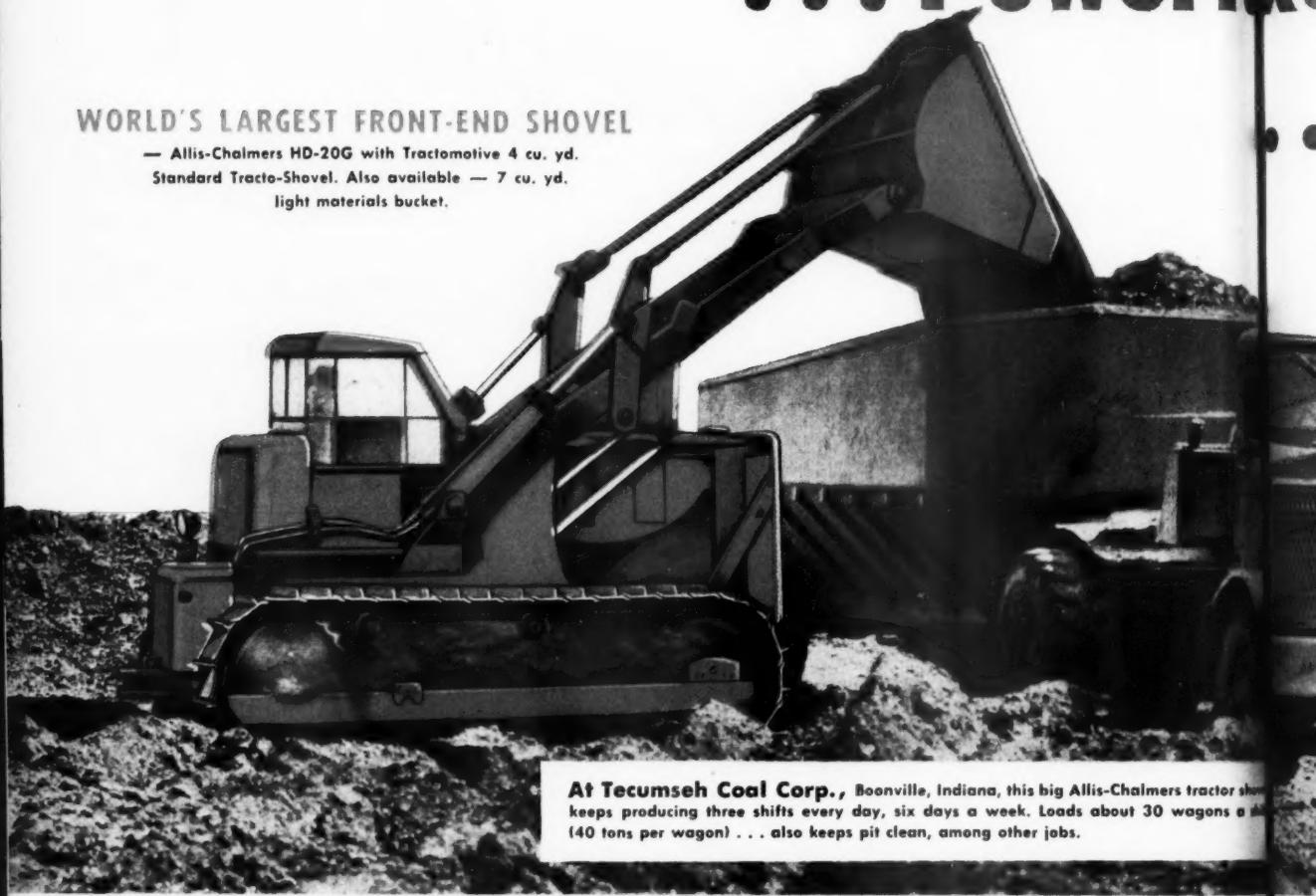


ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

now - a Tractor Shovel ... Powerful

WORLD'S LARGEST FRONT-END SHOVEL

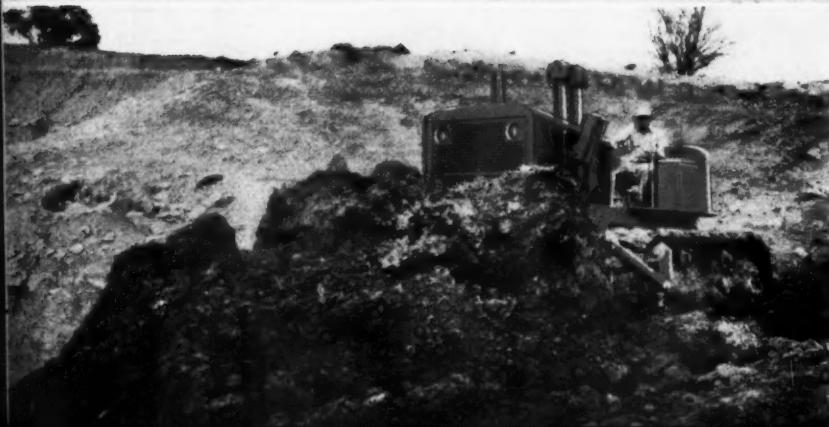
— Allis-Chalmers HD-20G with Tractomotive 4 cu. yd.
Standard Tracto-Shovel. Also available — 7 cu. yd.
light materials bucket.



At Tecumseh Coal Corp., Boonville, Indiana, this big Allis-Chalmers tractor shovel keeps producing three shifts every day, six days a week. Loads about 30 wagons a shift (40 tons per wagon) . . . also keeps pit clean, among other jobs.

THERE'S A RIGHT MACHINE FOR EVERY NEED

Bulldozing HD-20, with bulldozer blade, prepares a roadway into pit for stripping. As a dozer, this versatile tractor also builds haul roads, pushes material into reach of strippers, and levels spoil banks, strips hillsides, seams.



With Big Loading Capacity Excavating Ability . . . Real Versatility

A HIGHLY PRODUCTIVE MACHINE EVERY MINUTE
OF THE DAY . . . AT NEW LOW COST PER TON!

The HD-20G will be here, there, everywhere on your operation . . . saving money on different jobs, because it's versatile and powerful, fast maneuvering and fast traveling, big in capacity.

A powerful, rugged excavator — quickly digs and loads toughest materials, including shale and clay.

Loads coal right from the pit — out of some seams without blasting. Torque converter drive keeps bucket crowding constantly as it digs . . . no engine stalls.

Builds access roads, constructs ramps into pit for stripping shovels and trucks, loads from stockpiles — handles most digging, loading, leveling.

Prove to yourself that this outstanding combination can make more money for you. Ask your Allis-Chalmers industrial tractor dealer for all the facts.

The Newest, Finest Tractor Line on Earth

stripping — on a large scale — is another everyday job handled by the powerful HD-20. Both pushing and pulling operations, this tractor's torque converter drive balances speed and for maximum output at all times.



40.26 drawbar hp.
11,250 lb.



72 drawbar hp.
18,800 lb.



109 drawbar hp.
27,850 lb.



Hydraulic Torque
Converter Drive
175 net engine hp.
41,000 lb.

Each of the Allis-Chalmers crawlers gives you a new yardstick for rating tractors. Each sets new standards in its class for performance, strength, servicing, operation. In addition, a complete new line of Allied equipment makes

it possible for you to handle a wider variety of jobs faster, easier and at lower cost. For all the facts on any of these tractors, see your Allis-Chalmers dealer.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

up to 25% more production

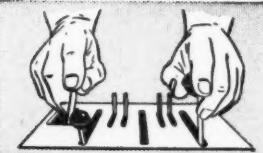
LINK-BELT SPEEDER with Speed-o-Matic controls



Dipple and Dipple, Morganstown, West Virginia, with millions of yards to handle, use five Link-Belt Speeders. This K-370's

full hydraulic controls mean a fast, smooth digging cycle—fewer service problems—increased production up to 25%.

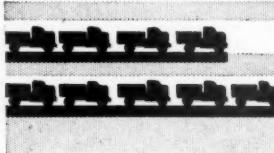
Speed-o-Matic full hydraulic controls means stepped-up production



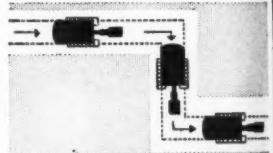
Speed-o-Matic Controls — fully hydraulic! You "feel" the load all the way. Simple, easy—fingers instead of muscles do work.



Eliminates up to 150 parts—cuts friction, no worn bushings, pins, links or clutch toggles to put you "down."

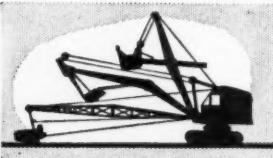


Up to 25% more production—fast operating cycle steps up output and profits. Effortless control keeps operator fatigue down.

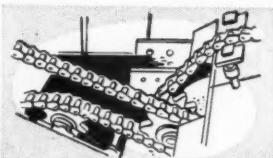


Turns on a Dime. Either track can drive or be locked independently. Hydraulic control gives instant response.

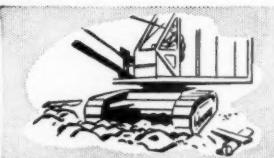
Here are other Link-Belt Speeder PLUS FEATURES that work for you



Convertibility—designed for peak production as shovel, crane, dragline or trench hoe. Convert in field—quickly, easily.



Independent Chain Crowd—is fast and positive. Self-adjusting to all boom angles. No cables to break, slip or adjust.



High Ground Clearance—eliminates snagging or fouling in rough areas. No projecting castings or easily damaged parts.



Service—fast, efficient. Link-Belt Speeder Service is nationwide—near you with replacement parts, factory-trained mechanics.

LINK-BELT SPEEDER CORPORATION

Builders of the most complete line of shovels, cranes and draglines

CEDAR RAPIDS, IOWA

12,744



NEW CRUCIBLE DOUBLE DIAMOND takes drill steel out of the “CROWBAR CLASS”

this Alloy
Hollow Drill Steel
has greater
fatigue strength...
cuts bit losses...
lasts longer

CRUCIBLE

first name in special purpose steels

52 years of *Fine* steelmaking

HOLLOW DRILL STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.
REX HIGH SPEED • TOOL • REZISTAL STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

ONE-PIECE
BIT HOLDER

BOWDIL
BITS

SET SCREW
LOCKS BIT
HOLDER

BIT-CARRYING
BODY SECURELY
WELDED TO
CHAIN

HEAVY
SHOULDERS
ON LINKS
CARRY
LOAD

LARGE
HEAT-TREATED
PINS

HEAVY-WALL
HARDENED
BUSHING

RADIAL
TRACK
GUIDES

DROP-FORGED
LINK AND
CONNECTOR

INGENIOUS
RIVET
LOCK

*Made by the makers
of the*



**STRONGEST CUTTER-BAR
IN THE COAL INDUSTRY**

BOWDIL BITS
for lowest cost per ton

THE BOWDIL

COMPANY

CANTON, OHIO



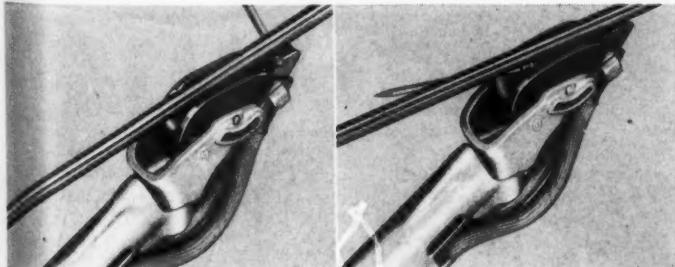
O-B Shoes Hug Wire at High Speeds!

Looking at it from above, you get to see a very important feature of an O-B Shoe — LENGTH OF WIRE CONTACT! Current transfers from wire to shoe at a multitude of points all along the line of contact. And as the two smaller photographs show, wire contact is maintained even when the shoe encounters an irreg-

ularity in the wire.

Both the O-B Type-L and Type-M Shoes provide this arc-free, wire-hugging action for your high speed, heavy duty haulage. Try them on your main haul motors. They'll hold the wire at all speeds, and their arc-free action will be kinder to your trolley wire!

A pencil makes an exaggerated bump for the shoe to pass. Note how the shoe pivots to maintain wire contact. An O-B Type-M Shoe is shown here.



4291-M

Exide-Ironclad

BATTERIES

**ARE YOUR BEST
POWER BUY—
AT ANY PRICE**

They PROVIDE ample power for fast, high-production haulage — more trips per shift, dependable round-the-clock performance, with no end-of-shift slowdown, no unscheduled down time . . . ASSURE inherent safety, with freedom from hazards of fire, fumes, noise . . . SHOW low costs of operation, maintenance, repair, depreciation. SIZES for all makes of battery-powered mine locomotives, trams, shuttle cars. Call in an Exide representative, and let him prove these facts.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" Reg. Trade-mark U. S. Pat. Off.



NOW....

SCREEN FINE, MOIST MATERIALS

Without Blinding!

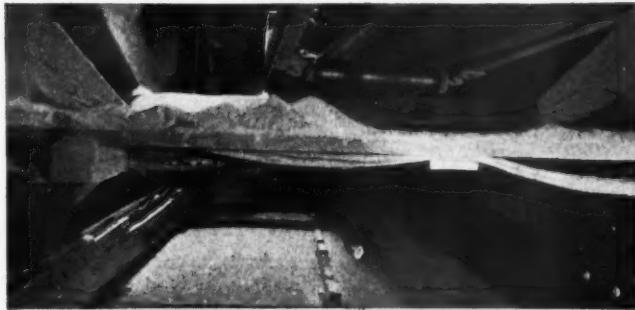


NO "TIME OUT" to clear fine or medium mesh screen cloth! You can screen fine, moist non-combustible materials *continuously* with new *Thermo-Deck* heating unit.

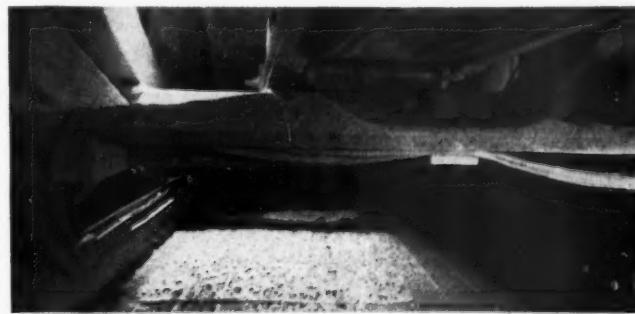
INCREASED CAPACITY! Heated screen cloth remains open, permitting more tonnage through the screen and better separation.

LOWER COSTS! Operating records show that heated screen cloth lasts up to three times as long when cloth does not have to be pounded free of blinding material. The *Thermo-Deck* heating unit can be easily applied in the field. Your nearby A-C representative can give you more details. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3602



POWER ON — *Thermo-Deck* heating unit keeps screen cloth clear on screen handling pulverized limestone.



POWER OFF — Troublesome blinding results on same screen when *Thermo-Deck* heating unit is turned off.

Send for ...

New 8-page bulletin containing complete facts on operation and application of the *Thermo-Deck* heating unit.

Bulletin 07B7812

Thermo-Deck is an Allis-Chalmers trademark.

ALLIS-CHALMERS



Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.



Pulverator



Jaw Crushers



Gyratory Crushers



Grinding Mills

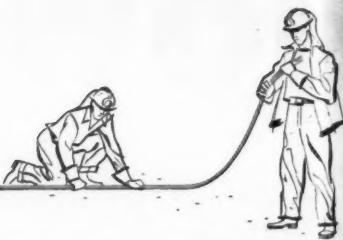


Vibrating Screens



Kilns, Coolers, Dryers

your continuous mining machine is only
as "continuous"
as the cable that powers it!



Continuous miners produced over 10 million tons of coal last year—and set a record! But it's expensive equipment to lie idle due to faulty cable. Since there's a big difference in cables, it pays to choose yours carefully.



for longer "break-free" service make sure it's



Cold Rubber Insulated Securityflex

The *only* economical cable is one that can take the toughest job conditions—impact, abrasion, crushing, cutting, heat, and water—and show a consistent record of fewer time-consuming breaks. In this respect Securityflex* is in a class by itself, doubly protected by cold rubber insulation—an Anaconda first—and rugged neoprene jacket. New flat-twin construction won't override, kink, or twist. Patented "anti-shock" breaker strip and flat-stranded ground wire offer safety protection to the cable and *safety-first* protection to mine-operating personnel.

This ANACONDA portable cable stands up well under tension, rides the reel easily, passes smoothly over guides, and won't fatigue readily on frequent sharp bends. Your nearest Anaconda Sales Office or Distributor can demonstrate why this sturdy cable will help boost your tonnage and reduce time out for costly repairs. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

52307 *Trademark

the right cable for the job **ANACONDA®** **wire and cable**

"COLMOL" on TIMKEN® bearings helps coal mine operate in the black

THIS "COLMOL" continuous mining machine, built by The Jeffrey Manufacturing Company, does the work of three machines! It cuts, drills and loads coal in one operation without the use of explosives. The machine has a capacity of 3 tons per minute, can produce up to 50 tons per man-day.

To keep the "COLMOL" in top operating shape and to keep operating expenses to a minimum, Jeffrey engineers use a total of 178 Timken® tapered roller bearings in the breaker heads, pump drive, conveyor and transmission. Timken bearings help

the "COLMOL" operate smoothly, with little noise and with practically no vibration... important factors in reducing operation fatigue.

In heavy duty mining equipment, bearing load capacity is an important design factor. As a result of tapered construction, Timken bearings carry the thrust and radial loads in any combination. Gears are held in proper alignment, reducing wear and maintenance. Line contact between rollers and races provides load capacity to spare.

Timken bearings hold housings

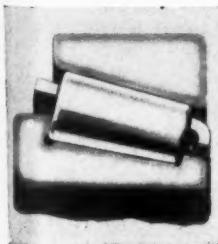
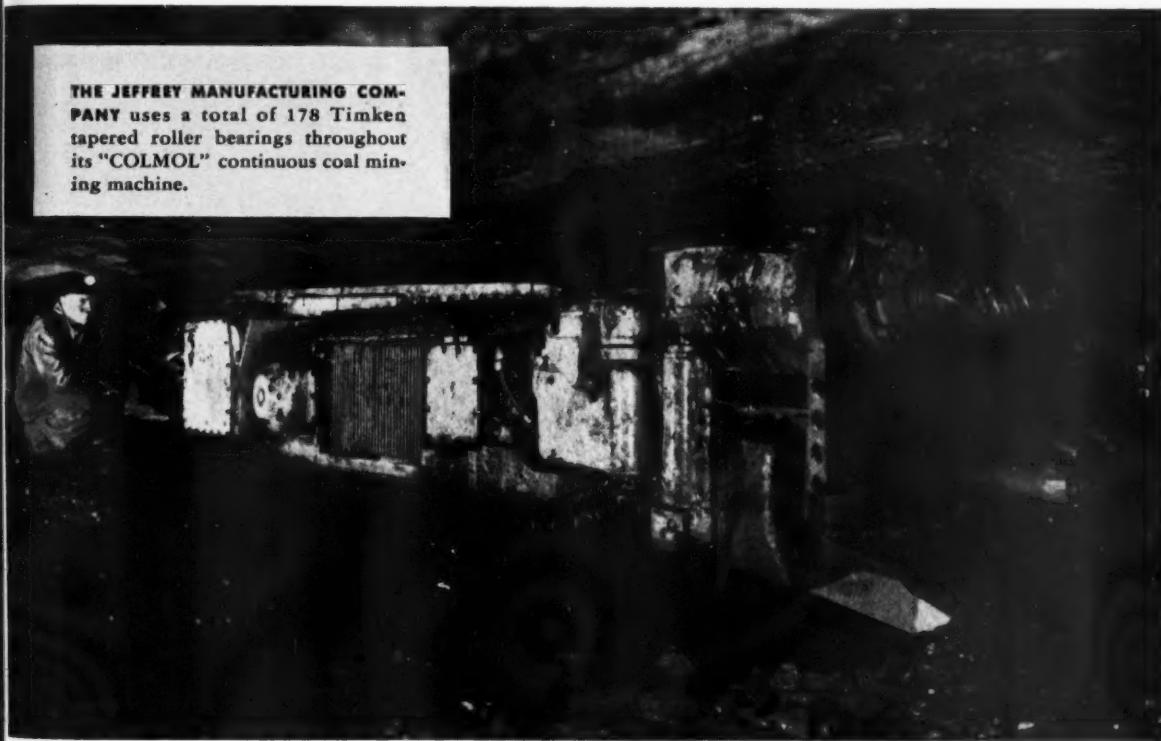
and shafts concentric. As a result, closures are more effective, dirt and coal dust are kept out, lubricant kept in.

If you're looking for low-cost, dependable performance in coal machinery or any other kind of equipment that uses bearings, be sure to specify Timken bearings. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best.

THE JEFFREY MANUFACTURING COMPANY uses a total of 178 Timken tapered roller bearings throughout its "COLMOL" continuous coal mining machine.

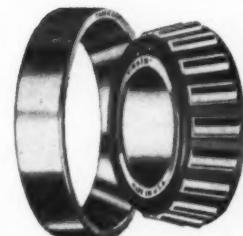


GREATER LOAD AREA

Because the load is carried on the line of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

Cummins® Diesels do so many jobs - so much better

...because they're

custom-built to fit the job



Shovels, cranes,
industrial locomotives



Drilling rigs, centrifugal
pumps, generator sets



Buses and
on-highway trucks



Earthmovers, logging
yards and loaders



Off-highway trucks,
crawler tractors



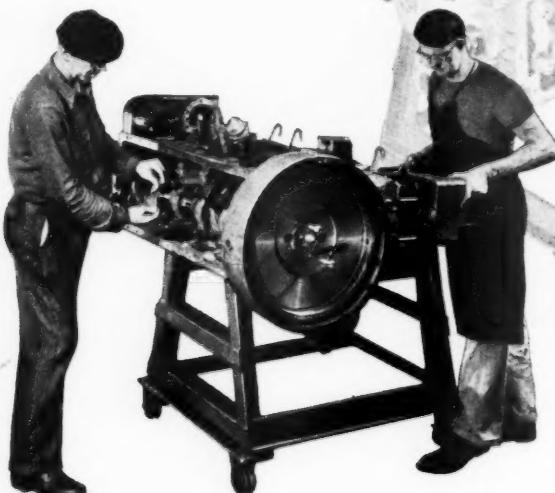
Work boats,
pleasure craft

Lightweight, high-speed Diesels (50-550 hp) for these and many other uses

...because they're

*BUILT
NOT
ONCE
BUT
TWICE*

Rugged, lightweight, high-speed Cummins Diesels are at work everywhere. Each engine is built *twice*. It's assembled, run-in tested, disassembled and inspected, then reassembled and tested again. This extra care in building, plus Cummins exclusive fuel system and an efficient and expanding service and parts organization, means minimum "down time", more power and profits for the user. See your Cummins dealer.



TRADEMARK REG. U. S. PAT. OFF.

**Diesel power by
CUMMINS**

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Export: Cummins Diesel Export Corporation • Columbus, Indiana, U.S.A. • Cable: Cumdix

making big savings in open-pit mining

The **I-R QUARRYMASTER**
cuts the cost of primary blast-hole
drilling in any kind of ore

HIGH drilling speed, low bit cost, minimum labor requirements, low service truck charges—these are but a few QUARRYMASTER advantages that give you the lowest possible drilling cost per ton. Fast drilling speeds mean more holes per day, permitting closer hole spacing for better fragmentation. The result is increased primary crusher efficiencies and reduced costs on loading and hauling equipment. Compare these features with any other drill rig.

- **DRILL ANY KIND OF ROCK**—from the softest limestones and dolomites to the hardest granites.
- **REAL DRILLING SPEED**—drills 25 to 60 feet per hour in limestone and 9 to 15 feet per hour in granite.
- **LOWEST BIT COST**—of any blast hole drilling method. Carset Bit life from 700 to 1600 feet in granite—up to 14,000 feet in soft, less abrasive formations.
- **NEEDS NO BLACKSMITH SHOP**—Carset Bits are easily handled and sharpened on the job. No falling off of drilling speeds because of dull bits.
- **REQUIRES NO SPECIALIZED LABOR**.

Ask your nearest Ingersoll-Rand representative about this completely self-contained, self-propelled outfit that drills 6-inch holes, has continuous hole cleaning, automatic rotation and is available in either diesel or electric drive.

INGERSOLL-RAND COMPANY
11 Broadway, New York 4, New York

Ingersoll-Rand

QUARRYMASTER

711-5

What to look for IN SELECTING A MODERN ELECTRIC CAP LAMP



IMPORTANT SAVINGS

IN MAINTENANCE LABOR

A most significant measure of sound engineering in a miner's electric cap lamp is *minimum maintenance*. The less work and less time needed to keep your lamps at full efficiency is a direct confirmation of superior design—and a steady source of savings for management each year.

WHEAT LAMPS deliver appreciable savings in maintenance labor costs compared to any other system of individual light for the miner, just as WHEAT Lamps produce better, more uniform light on the job!

MINIMUM MAINTENANCE

Watering of the lamps at regular intervals, occasional bulb replacement and ordinary cleanliness present all that is normally required to keep WHEAT Lamps in the best of condition.

GREATER SIMPLICITY

No covers to open, no terminals to clean, no valves to free, no cells to re-solution, no lamps to rack—*no wonder* WHEAT Lamps reduce maintenance to a fraction in time and cost!

EASY TO RENEW

When it is time to replace the battery there's never any fuss with WHEAT—just detach cable from headpiece and attach leads of a spare battery. *A new WHEAT battery means a lamp as good as new.*

"NATIONAL"—always at your service!

Our trained service representatives, district warehouses and regularly-scheduled trucks serve the inspection and maintenance needs of WHEAT Lamp installations everywhere. Call National Mine Service for a WHEAT demonstration in your mine!

National Mine
Service Company



Has the Facilities—Delivers the Goods

EMERCO DIVISION
Beckley, W. Va.

KY.-VA. DIVISION
Jenkins, Ky.

ALL-STATE DIVISION
Logan, W. Va.

ANTHRACITE DIVISION
Forty Fort, Pa.

WHITEMAN DIVISION
Indiana and Altoona, Pa.

WESTERN KY. DIVISION
Madisonville, Ky.

V
3
8
4

A
F
F



Miners
do more
and like it!

... with easy-to-handle
Le Roi-CLEVELAND 2-way air-feed sinker drills

*Men get less tired!
Safety records improve!
Tonnages rise!*

TAKE the hardest part of the work out of drilling and speed it up, too. Equip your miners with Le Roi-CLEVELAND HC10 Air-feed Sinker Drills — then watch tonnages per man-shift go up.

A lightweight column — pneumatic- or screw-type — supports the HC10. Setting-up takes only a few minutes. Feeding is done by air-pressure. All controls are handy.

Quick reverse feed makes it quick and easy to change steels. There are no swing or dump nuts to loosen or tighten.

The fast, light blows of Le Roi-CLEVELAND Air-Feed Sinker Drills are just right for carbide bits. You get maximum bit life — can use smaller bits for higher drilling speeds.

In addition to the popular HC10 model with 45-lb. drill, Le Roi-CLEVELAND Air-feed Sinker Drills are available in an HC23 model with 3 1/8" bore. Both models help your miners produce more footage and greater tonnages. And because the men don't get so tired, safety records improve.

Write today for complete information.



LE ROI COMPANY

CLEVELAND ROCK DRILL DIVISION

12500 Berea Road, Cleveland 11, Ohio

Plants: Milwaukee, Cleveland and Greenwich, Ohio

RD-44

Classification and Thickening: Cyclones are attracting wide interest in this field. Their use as primary thickeners in coal preparation plants is reported to require lower investment costs and less space over conventional thickeners. They are claimed to de-slime effectively down to 10 microns, or to thicken with very dense spigot products.....

Excerpt from the article "Mineral Dressing" which appeared in the February, 1952, issue of Mining Congress Journal.

The Heyl & Patterson Cyclone Thickener is a device utilizing Centrifugal Force to separate a suspension of solids in water into a thickened underflow and a low concentration overflow. The H&P Cyclone Thickener generates Centrifugal Forces up to 12,000 times gravity to separate the solids from the fluid.

Hundreds of Heyl & Patterson Cyclone Thickeners are now in use in the mining industry . . . controlling solids in Circulating Systems and separating solids from liquids.

The Cyclone equipment provides an economical and practical method of clearing up problems of:

PULP Thickening . . .
PULP Classification . . .
PULP Concentration . . .
WATER Clarification

Heyl & Patterson laboratory and field tests have provided a sound basis for predicting accurately the Cyclone performance on most feeds. For further information ask for Booklet 5-CT-51 or send us your problem and we will tell you how a Cyclone application can provide the answer.

ADVANTAGES OF CYCLONE THICKENER EQUIPMENT

1. Occupies a small amount of space.
2. Has a low initial cost (only a fraction of other thickening methods).
3. Needs a minimum amount of upkeep.
4. No moving parts.

Cyclone Thickeners
 Thermal Dryers
 The Drying Dutchman
 Reinkeveld Centrifugal Dryer
 Thoson Sampling Systems
 Ore Bridges
 Railroad Car Dumpers
 High-Lift-Turnover-Rotary
 Rotary Mine Car Dumpers
 Car Hauls and Boat Movers

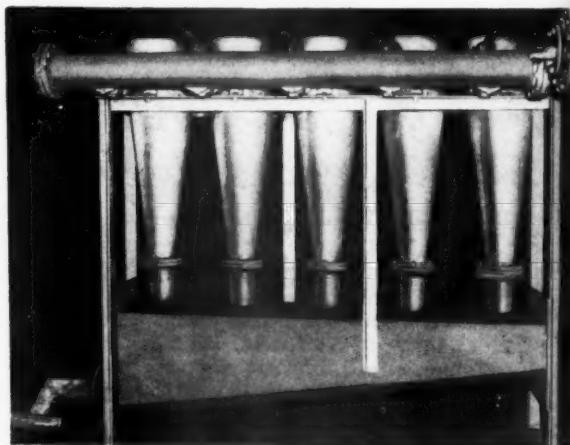
MILLING and ORE DRESSING MEN
will be interested in H&P

CYCLONE THICKENER EQUIPMENT

... as THE ANSWER to Many of The Classification & Thickening Problems



The standard 3" Cyclone Manifold consisting of a feed valve, combination feed chamber and overflow chamber, overflow valve, underflow pan and twenty-two Cyclones. The standard 3" Manifold consisting of twenty-two Cyclones has a capacity of 250 G.P.M. and is designed to operate at 40 P.S.I.



A typical manifold of five 14" Cyclones. These larger Cyclones are usually operated on lower pressure and are generally used as Classifiers.

Heyl & Patterson, Inc.
 "SINCE 1887"

55 WATER STREET • PITTSBURGH 22, PA

HEAVY BULK MATERIALS HANDLING EQUIPMENT
ALL THE WAY FROM DESIGN TO ERECTION



Good Breakage

makes efficiency go up
coal come down, when you use

Coal brought down in just the right size means faster loading and higher profits. It's this kind of good breakage you get with American Explosives—plus the dependability that gives you a good shot which goes off when you want it, where you want it.

American Explosives are available in a wide variety of densities and velocities from any one of several conveniently located magazines or plants... *make your next order American.*

Capable Field Engineers are Available at Your Call

High Explosives • Permissibles • Blasting Powder • Blasting Accessories

AMERICAN CYANAMID COMPANY
EXPLOSIVES

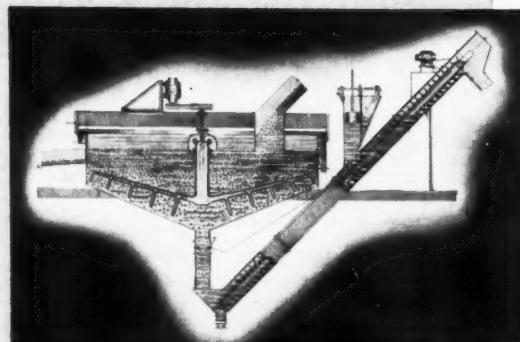
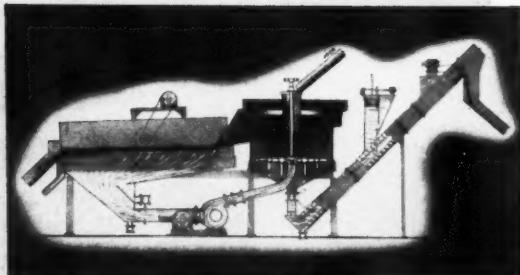
AMERICAN Cyanamid COMPANY
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Sales Offices: Pittsburgh, Pa., Bluefield, W. Va., Scranton, Pa.
Chicago, Ill., Pottsville, Pa., Maynard, Mass.

FADS AND FACTS

ABOUT FINE-COAL

CLEANING PROCESSES



So many fine-coal cleaning fads have come and gone in the past thirty years that it pays to investigate the facts thoroughly before you buy.

Here are some facts about Roberts & Schaefer Hydrotator Process acceptance—

1. The first fact is that the Hydrotator Process is *not a fad*; it's here to stay. The first installations on bituminous coal were made in 1942. They are still in operation at peak efficiency.
2. The number of Hydrotator installations has grown steadily, year after year. The current annual capacity of Hydrotator Process-Units in operation is 5 million tons.
3. On the basis of two years performance in two mines, a contract for Hydrotator fine-coal washing equipment for a third mine has recently been placed by one of the industry's largest operators.*

Here are brief facts about the Roberts & Schaefer Hydrotator Process—

1. Hydrotator Process equipment has unlimited layout possibilities, permitting you to fit it into any future preparation plans or into your present plant.
2. The Hydrotator Process is economical of space—gives you maximum output while using a minimum of floor space.
3. It is economical of labor, power and water.
4. The Hydrotator Process is completely automatic, simple to operate.
5. It compensates for changes in quality and quantity of intake—gives uniform results.

Next to installing Roberts & Schaefer Hydrotator equipment in your plant, the best way to try it out is to let us test a carload of your coal in our new testing plant near Chicago. Following such a test you receive a complete report of all important facts and figures. Write for full information about this valuable service.

*Name on request.



FURTHER FACTS about the Roberts & Schaefer Hydrotator Process and other Roberts & Schaefer wet washing equipment are contained in Bulletin No. 176. Write today for your free copy.

ROBERTS & SCHAEFER COMPANY

130 North Wells Street, Chicago 6, Illinois

1315 Henry W. Oliver Bldg.
PITTSBURGH 22, PA.

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HUNTINGTON 10, W. VA.

254 West 54th Street, NEW YORK 19, N. Y.

FOREIGN DEPT.: International Mfg. & Equipment Co., Inc.,
220 Broadway, New York 38, N.Y., U.S.A.

Mining

CONGRESS JOURNAL

Published for the Entire Mining Industry

by the AMERICAN MINING CONGRESS

JOHN C. FOX, Editor

VOLUME 38

APRIL, 1952

NUMBER 4

Now Is The Time

IN the five days from March 17 to 21 the Federal Government's income, nearly all from taxes, was \$5,000,000 more than the entire Federal tax revenue in 1940. The tax tab presented by Uncle Sam to his nieces and nephews averages out to \$1,589 per family for the current year. If the budget proposed for fiscal 1953 is adopted and all expenditures therein met from taxes, the bill for each family will go up almost \$350.

Between the end of World War II and June 1953 our Federal Government will have spent more than \$400 billion. This staggering sum is \$90 billion more than was laid out during World War II, and \$235 billion more than it cost to run the United States during its entire 150-year history prior to 1940.

This snowballing of public expenditures has been attended by continuous deficit financing. In 21 years, there has been a surplus in only three. Deficit financing means that Government must borrow the money to meet its obligations. The Federal Debt is already more than a quarter of a trillion dollars and two years hence will be close to a third of a trillion.

Those who borrow must repay their debts eventually—and with interest. But if year after year we have annual deficits, from where will the funds come to pay even the interest—let alone retire some of the principal?

Every housewife knows that expenses must not exceed income if the family is to survive. If outgo shows signs of outstripping income, she will seek out the items causing the deficit and pare a little here, a little there until once more the budget is balanced and the family is safe.

On a larger scale, corporations employ the same tactics to make ends meet—or they pass out of existence. What applies to the home, the basic unit of our national strength—to the corporation, the business unit of the country—must apply also to Government, the biggest business in the world.

Federal income for fiscal 1953, it is estimated will reach \$71 billion at present tax rates. The President has asked for \$85.4 billion to run the Govern-

ment business during the same year. We are now paying taxes at the highest rates in all our history. These rates have already crippled incentive. Any increase could kill it altogether. There remains then only the practice of drastic economies in all departments to reduce expenditures to a level commensurate with income. The House of Representatives has already shown a disposition to cut appropriations to avoid national insolvency. Let us hope that the Senate will also do its duty.

Congress must consider eleven appropriation bills in all. That these can be handled to eliminate most, if not all, of the deficit has been clearly illustrated in various recent studies including the budget proposed by Senator Byrd of Virginia. These manifestations of an awakened public opinion should impel Congress to examine carefully every bill to dispense funds or obligate the Federal Government to expenditures of the money entrusted to its care by the taxpayers of this nation.

It is the duty of Congress to do so, just as it is the duty of every taxpayer to call for a showdown on the pay-as-we-go policy.

Come To Cincinnati

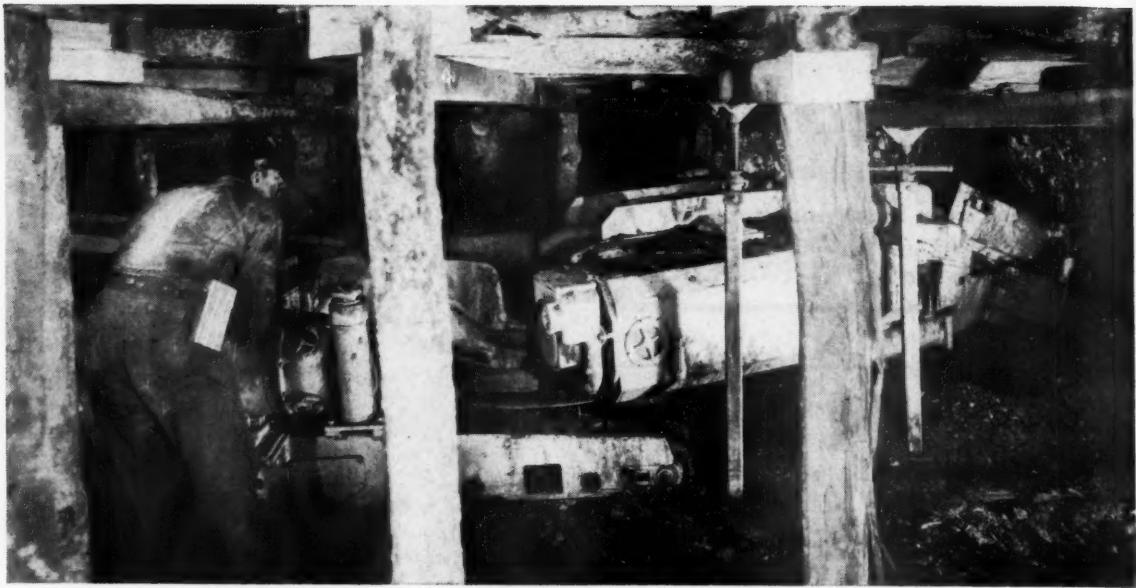
PAGES 40 to 51 of this issue are devoted to the Annual Coal Convention of the American Mining Congress. The locale for this outstanding meeting May 5-7 is Cincinnati, Ohio.

Case histories, based on facts and figures, form the solid core of the papers to be delivered at the operating sessions. These are actual experiences given by the men who have lived with, and solved the problems posed by the coal industry's drive toward increased production with greater efficiency and safety. Frank discussion with participation by every member of the audience will be the order of the day.

Featured speakers at the luncheons are men who have an important story to relate and know how to tell it. These men are not going to talk in general terms of "home and mother" but will point out explicitly how their listeners can help to make these United States an even better place in which to live.

Serious business is the prime purpose of the 1952 Coal Convention but the bread of serious business needs leavening too. The traditional Coal Miners Party will be a gay affair, where fun and good fellowship will reign. Baseball Nite has been set aside for those who wish to enjoy the national game. "Super" entertainment and dancing will feature the evening after the Annual "Speechless" Banquet.

For a 24-karat slant on how to do a better job, and an unparalleled opportunity to see and take part in all the doings—Come to Cincinnati!



A single machine replaces four operating units—cutting, drilling, blasting and loading

Pillar Extraction With Continuous Machines

Taking Advantage of Continuous Mining Machine Characteristics Permitted Low Cost Extraction of Chain and Barrier Pillars with High Recovery

By J. A. YOUNKINS

Assistant General Superintendent, Coal Department
Duquesne Light Co.

OPERATIONS herein described are confined entirely within the limits of the Harwick Mine of the Duquesne Light Co., located at Harwick, approximately one mile north of Cheswick, Pa. The mine is in the Thick Freeport Coal Bed in the heart of the Thick Freeport District. Harwick Mine is the principal source of fuel for the Duquesne Light Co.'s Colfax Power Station located at Cheswick.

The original mine, already considerably developed, was acquired by the company in 1916. In subsequent years it was fully developed for conventional hand loading by the room and pillar system. By the time the mine was completely mechanized during the period 1939-1941, operations were virtually all on retreat. To augment the dwindling life of the property in 1942, the adjoining Monarch Mine was leased from the

Union Collieries Co. and was consolidated with Harwick, adding some 500 acres of minable coal, almost completely developed and on the retreat. In 1943 the adjoining Cornell Mine was purchased from the Crucible Fuel Co., adding some 300 acres more of minable coal in the form of chain and barrier pillars with some additional acreage bordering outlined "want" areas still to be explored.

In this locality "want" areas are irregular areas from which the coal bed has been partially, and sometimes entirely, eroded and replaced by irregular sandstone deposits. These areas are so irregular in shape and coal height that the only practical system of exploration, yet devised, is to probe them for distances of 200 to 300 ft in hopes of going through to higher coal. This involves brushing varying amounts of sandrock top,

where it is necessary to drill with compressed air equipment.

It will be apparent from this brief description that any program of mechanization at Harwick must be adaptable, within reasonable limitations, to the mine as it stands. The mine cannot be redeveloped to suit the program. Prior to the advent of the continuous miner, the typical mechanical loading unit, consisted of a crawler mounted loading machine loading into mine cars from faces undercut with shortwall cutting machines; drilled with post-mounted electric drills and blasted with permissible explosives. An explosion-proof locomotive handled the mine cars behind the loading machine and working places were timbered to a minimum standard of crossbars on six-ft centers set on legs.

Economics Dictate Change

Contractual obligations such as portal to portal pay and paid lunch periods decreased working time at the face. This, together with increased welfare payments per ton; decreased section productivity due to a greater proportion of production from chain and barrier pillar recovery, painted a dark economic picture for the future of Harwick Mine with conventional mechanical loading equipment.

Development of the Joy continuous

miner with its promise of increased productivity per manshift from small working areas, together with the flexibility inherent in the design of the machine, resulted in the decision to purchase and install such a unit in a section of retreating barrier and chain pillars. The section chosen was in the old Monarch Mine because previous experience in this section had indicated easier cutting and lower bit cost with tungsten carbide tipped bits.

Continuous mining equipment installed in June, 1950, with the first unit was as follows:

1-4 JCM High type Joy Continuous Miner.

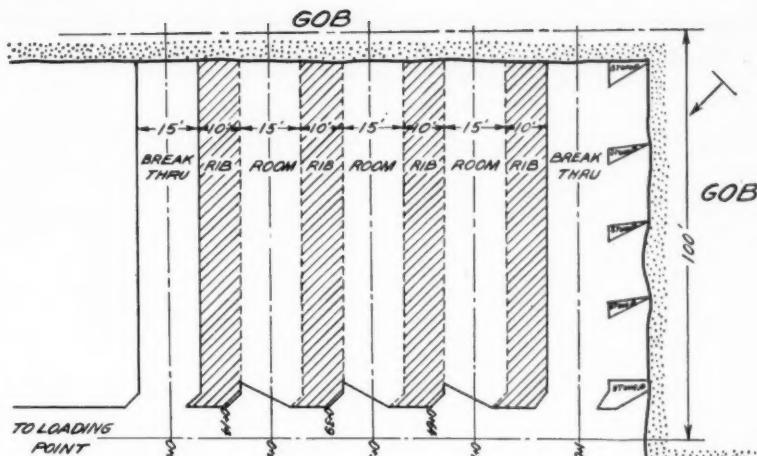
2-5 SC Shuttle cars, capacity seven tons

1—John Bean high-pressure water spray pump, 15 gpm at 500 psi

1—Tire pump compressor
1—Special Phillips equipment

1—Special Phillips equipment carrier for the 4 JCM and Safety Circuit Centers for the 4 JCM and each shuttle car

In addition to the above equipment an eight-ton locomotive was converted to the robot type for moving cars past the loading point. This was accomplished by installing a counterweighed magnetic brake, geared through a jack shaft to the truck gear on one set of trucks. Power is supplied to the locomotive by a separate trolley wire through a push button controlled magnetic contactor. The push button is located at the loading point for operation by the shuttle car operator. The locomotive controller is set on the second or third point and when the push button is held in, the magnetic brake releases against the counterweight. When the push button is released, power is cut



Plan for mining pillars to protect the operator and machine

off the locomotive and the counter-weight automatically sets the brake. This arrangement works satisfactorily and two more locomotives were similarly converted to serve the two additional continuous mining units installed.

It was originally planned to use one shuttle car as a surge car, discharging into the transportation car. The crew was set up with one miner operator, two shuttle car operators, two timbermen, one mechanic and one face boss, a total of seven men.

Surge Car Inefficient

It soon became evident that the use of one shuttle car as a surge car was inefficient. Roof height prevented raising the discharge boom of the surge car high enough to fully load

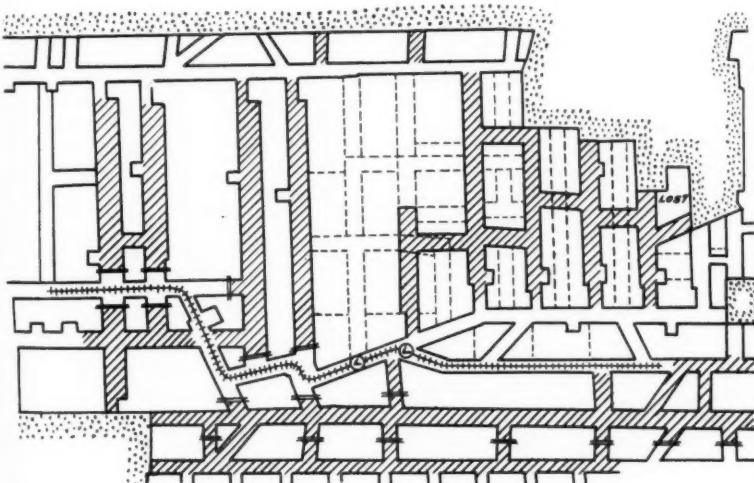
the transportation car. Only about half the capacity of both surge and transportation cars was in effective use. The continuous miner did not clean the bottom sufficiently for good shuttle car haulage, and a loading machine was needed on the section to clean up the haulage road once each shift. Therefore, the surge car was eliminated and the loading machine was used behind the mining machine. The miner was allowed to discharge onto the floor from which the loading machine relayed the coal to the shuttle car. This arrangement gave good bottom clean up, adequate surge capacity to take care of minor haulage delays, and effective use of the full seven-ton capacity of the transportation car.

Modify Mining System

It had been decided prior to the installation of the first miner, not to follow the normal system of open-end lifts across the pillars. It would not be advisable to start a second lift off any one pillar unless the preceding mined-out lift caved right on schedule. This seldom happens, and sometimes as many as two or three shifts may pass before the fall comes. To continue open-end lifting might require at least one, and sometimes two new set-ups or moves each shift, each requiring from 30 to 45 min.

To avoid such complications it was decided to leave a 10-ft fender next to the gob; driving a 15-ft lift across the pillar; slabbing back the fender and leaving small stumps to control the roof until the lift was completed. Then the stumps could be shot to bring the fall. This system has worked very well and the fall can be made while the next lift is being driven across the pillar.

A rigid system of timbering is followed. Five by 7-in. by 14-ft cross-bars on legs are set on a minimum of six-ft centers. When the miner has advanced to the point where the op-



This area had to be reconditioned before installing a continuous miner.

MECHANICAL LOST TIME DELAYS ON FACE LOADING EQUIPMENT FOR ONE UNIT FROM FEBRUARY 1 TO DECEMBER 31, 1951

Continuous Miner:

Ripper chains	2,960 Minutes
Hydraulic hose	1,730 "
Water lines	140 "
Belts	165 "
Scrolls	655 "
Front conveyor	915 "
Rear conveyor	1,440 "
Chain on sheave	1,130 "
Electric	1,100 "
Miscellaneous	1,985 "
Total continuous miner	11,950 Minutes
Shuttle car	400 "
Mechanical loader	455 "
Locomotive	0 "
Total delays	12,805 Minutes
Shifts worked	624
Delays per shift	20.5 "
Tons mined	118,319.50

erator is under the last timber, operations are stopped and another timber is set. The hydraulic jacks provided on the machine are used for this purpose. This procedure automatically sets the center to center distance of six ft. If roof conditions require it, timbers are set closer as needed. No timbers are set in the slab cuts through the 10-ft rib or fender next to the gob as the machine reaches through leaving the operator protected by the timbers set in the lift.

Contrary to the historic mining plan, when mining with the continuous machine, no attempt was made to carry a fracture line at a 45° angle across the panel. Actually the fracture line was carried back at right angles to the room entries. This resulted in more efficient extraction and less moving delay.

Supervision Important

Difficulty was experienced in picking up old rib lines. In one case the miner was partially covered because inadequate stumps were left on the gob side of the unit. Extraction of stumps with the miner is so rapid that care must be taken not to remove critical support before the immediate roof has begun to settle. The temptation to "get it all" has caused several falls on the miners, forcing the adoption of rigid rules as to the size of stumps left for protection. It can readily be seen that in extracting room chain pillars by splitting up through the center and retreating fenders left and right from the center split, standard projections must be modified to suit conditions. Considerable reliance must be placed upon the judgment of the immediate supervisors as to what constitutes adequate stump protection, and where it should be left. That these men have exercised sound judgment is evidenced by the fact that in 1951, three continuous miners averaged 86.33 percent recovery without a single lost time accident.

absorbs enough to increase the "as loaded" moisture to about 1.5 percent. Rock dust is applied liberally and regularly behind the curtain to dilute the dust deposited by the air current.

Recently a series of tests using "M" compound as a wetting agent were begun. Results are not yet conclusive, but the first test indicated that with the wetting agent, the quantity of dust deposited behind the curtain in the first 30 ft immediately behind the miner was about eight grams of

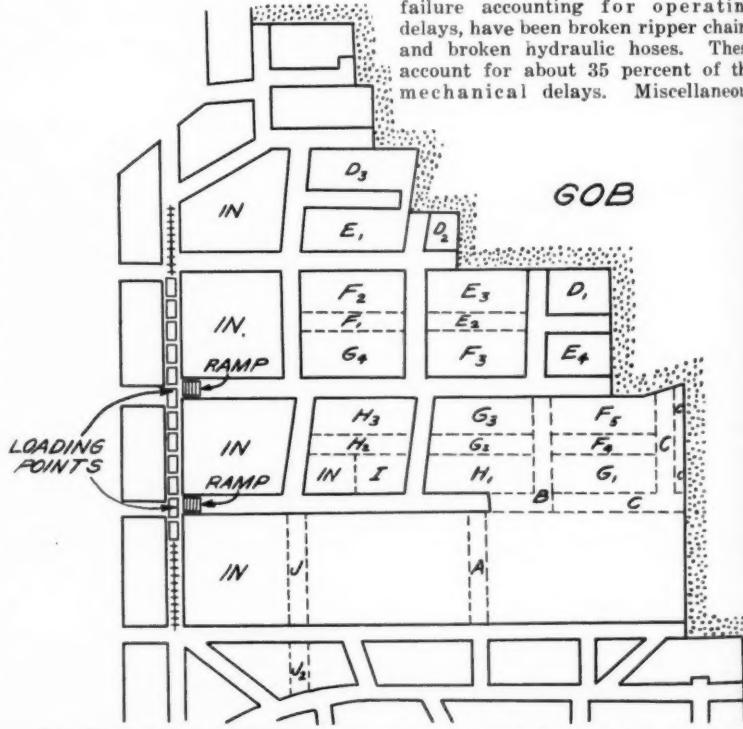
ANALYSIS OF OPERATING SHIFT TIME

	Percent Shift Time	Percent Production Time
Operating	47.2	61.3
Timbering	16.7	21.7
Mechanical Delays	5.0	6.5
Miscellaneous Delays	8.1	10.5
Lunch	6.3	...
Travel Time	16.7	...
	100.0	100.0

minus 20 mesh per sq ft of floor area. The count was 19.5 grams per sq ft before. This indicates that more dust is dropped in the face area to be picked up by the loading machine, when a wetting agent is used.

Production Costs Compared

The largest sources of mechanical failure accounting for operating delays, have been broken ripper chains and broken hydraulic hoses. These account for about 35 percent of the mechanical delays. Miscellaneous



Produce Finer Coal

Miners produce considerably finer coal, there being practically no plus four in. The percentage of plus two in. decreased from 26 percent in conventional run of mine to three percent and the percentage of minus $\frac{3}{16}$ in. increased from 24 percent in conventional run of mine to about 33 percent. There is approximately an increase of 50 percent in the percentage of minus 48 mesh in continuous miner product.

The type of chain lacing has some effect on the amount of minus $\frac{3}{16}$ in. size produced. With the "Illinois" lacing (bit blocks set in a diagonal line across the ripper bar) the minus $\frac{3}{16}$ in. averaged 37 per cent. With the "Core" lacing (bit blocks arranged in a staggered inverted "V" pattern) and with bit positions so arranged that cores about one in. wide are left in the face between kerfs, the minus $\frac{3}{16}$ in. averaged 29 percent.

Coal Quality Improved

At first considerable difficulty was experienced by the operator in keeping his cutting head from gouging into the bottom and top. He could tell only from the "feel" of the machine, when he was cutting these harder

TABLE I

Continuous Miner Conventional Unit	Tons Per Man Shift	Section Cost Per Ton			Total
		Labor	Supplies	Total	
Continuous Miner	20.1	\$0.894	\$0.389	\$1.283	
Conventional Unit	10.4	\$1.589	\$0.413	\$2.002	

TABLE II

Operating	Continuous Miner	Section Cost Per Ton			Total
		Maintenance	Other Equipment	Total	
Labor	\$0.675	\$1.176	\$0.403	\$2.119	\$8.894
Supplies	.155	.181	.053	.234	.389
		\$0.830	\$0.357	\$0.096	\$1.283

delays include such items as moving time, waiting for empties, examining roof and stumps, where mining stumps, and other unusual delays.

Since a continuous miner was operating on barrier pillars on one side of a set of main entries and a conventional unit on the other side, it was possible to get a direct cost and performance comparison on the two types of mining, under conditions which were as nearly identical as possible. The major items of comparison, based upon six months average performance from July to December, 1950, are shown in Table I.

Both sets of figures include all maintenance labor and supplies used to keep the respective units in operation. They also include supervisory charges.

An analysis of the operating and maintenance costs for the continuous miner over the same period is given in Table II.

It should be noted that the maintenance labor charge of \$0.176 per ton against the continuous miner includes the full time of the shift mechanic. Actually, he spends only half his time on maintenance and the remainder on operation. He helps with timbering, bratticing, extending pipe lines, changing bits, greasing and general work which is legitimately chargeable to operation, rather than maintenance. It would therefore be fair to deduct \$0.05 per ton from \$0.176 making the actual maintenance labor against the miner \$0.126 per ton and the total maintenance cost \$0.307. This compares with an average total maintenance cost against equivalent equipment (loading machines, cutting machines and drills) on the conventional mechanical loading unit of \$0.225 per ton, an increase of slightly more than \$0.08 per ton.

The maintenance figures for continuous mining do not include bit cost, which is charged as an operating supply. Bit replacement cost averages \$0.039 per ton at a charge of \$1.35 per bit. Bit changes have averaged 12 per shift and bits are resharpened twice on the average, giving three uses per bit.

The cost figures given above were for the first six months of operation of the first continuous mining unit. Additional units were installed in February and March of 1951, and the following summary of the section costs of all continuous mining units versus all conventional units for the year 1951, checks surprisingly well with the first comparison of single units in 1950.

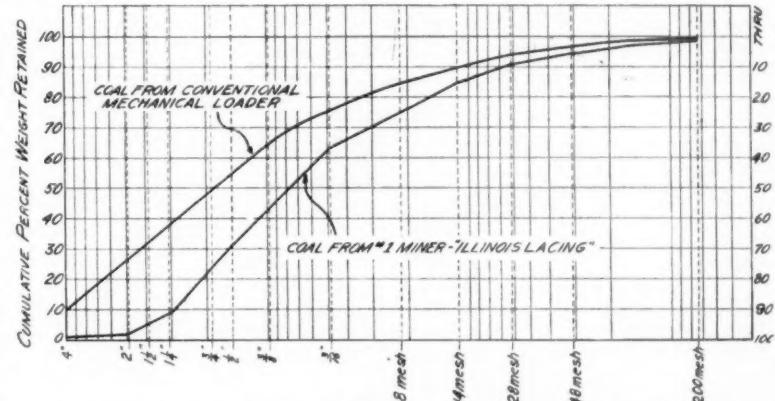
The breakdown of operating and maintenance labor and supplies for 1951 remains substantially the same as the figures previously given for the latter part of 1950.

	Productivity 1951		Section Cost Per Ton 1951		
	Tons Per Shift	Tons Per Man Shift	Labor	Supplies	Total
4 Conventional Units	102.7	10.8	\$1.677	\$465	\$2.142
3 Continuous Miner Units	177.4	21.6	\$0.890	\$403	\$1.293

The largest single item of maintenance on the continuous miner during our experience has been cutting chains. A set of six chains has so far been good for from 30,000 to 40,000 tons of coal and the cost of new chains together with new bottom guides and wearing strips have indicated an average cost of between \$0.07 and \$0.08 per ton. Rebuilding chains has so far given no improvement of this cost.

strata. By that time, he had penetrated from three to six in. into them the resulting impurities mined were considerable. To aid the operator in determining just where his bit tips were cutting, a simple indicating device was installed on the machine to let the operator see the exact horizon on which the tips of the bits were cutting. The device consisted of a simple arrangement of pivoted

(Continued on page 67)



Graph compares size consist of the product from mechanical loaders and continuous miners on a weight basis



1952 Coal Convention

With sights set on a 600,000,000-ton year, members of the coal mining industry will converge on Cincinnati for the American Mining Congress 1952 Coal Convention, May 5-7. There, leading authorities from Industry and Government will point the way to achieve this goal. After hours, social events and entertainment will provide fun and relaxation for the coal men and their ladies.

AMERICA'S industrial might is based largely on her superior ability to produce coal. In turn that ability is based on the free interchange of ideas and technical information among our coal mining men. Each year they gather from all parts of the country to attend the coal mining industry's postgraduate course—the American Mining Congress annual coal convention.

This year this outstanding example of a forum for the free exchange of ideas will be held in Cincinnati on May 5, 6 and 7. Mining men and manufacturers' representatives will gather to attend the technical and general sessions, the social functions, and to meet old friends and make new ones.

An exceptionally fine program has been arranged. Last November the Program Committee met in Pittsburgh to select subjects of greatest interest and value to the men who produce this country's coal. Under the chairmanship of Kenneth A. Spencer, the Committee prepared a series of sessions dealing with every important topic related to coal mining—as shown in the Final Program which appears on the following pages.

There are ten sessions in all, and two luncheons. Each session is well balanced and has been scheduled so that the time of those who attend will be most efficiently utilized.

Luncheon speakers have been chosen with an eye toward furnishing information and inspiration. On Monday, Thomas E. Millsop, president of Weirton Steel Co., will deliver an address on the general topic of "Businessmen in Politics." Mr. Millsop is a firm believer in the idea that men in business and the professions can no longer leave the management of our nation to professional politicians. He practices what he preaches since he has been Mayor of Weirton, W. Va., for the last five years. Those attending the luncheon Tuesday will hear Dr. Kenneth McFarland, educational consultant, General Motors Corp., speak about free enterprise and Americanism. The title



L. C. Campbell
Vice-President
Eastern Gas & Fuel Associate
Chairman, Coal Division



K. A. Spencer
President
Pittsburg and Midway Coal Mining Co.
Chairman, Program Committee

Program Committee

R. L. ADAMS
Old Ben Coal Co.
L. E. BASSHAM
Harlan Wallins Coal Corp.
J. R. BAZLEY
J. Robert Bazley, Inc.
C. R. BOURLAND
The New River Co.
A. BREITENSTEIN
U. S. Steel Co.
W. H. COOKE
Little Sister Coal Corp.
W. J. CRAWFORD
Enos Coal Mining Co.
C. O. CRUMP
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HARRY S. GAY
Gay Coal & Coke Co.
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D. K. HEIPLE
R. G. LeTourneau, Inc.
R. E. HENDERSON
Truax-Traer Coal Co.
GEORGE W. HOSKINS
Harnischfeger Corp.
R. H. HUGHES
Clinchfield Coal Co.
DAVID INGLE, JR.
Ingle Coal Co.
R. U. JACKSON
Hewitt-Robins Incorporated
W. B. JAMISON
Jamison Coal Coke Co.
WALTER J. JOHNSON
Sheridan Wyoming Coal Co.
CHAS. E. LAWALL
Chesapeake & Ohio Railroad
J. B. LONG
Long Super Mine Car Co.

D. L. McELROY
Pittsburgh Consolidation Coal Co.
M. C. MILLER
Sun Oil Co.
R. E. MOORE
C. A. Hughes & Co.
C. R. NAILLER
Christopher Coal Co.
JAMES M. OSBORNE
Youghiogheny & Ohio Coal Co.
MOSS PATTERSON
West Kentucky Coal Co.
J. G. PUTERBAUGH
McAlester Fuel Co.
HEWITT SMITH
Woodward Iron Co.
V. L. SNOW
Euclid Road Machinery Co.
CLARK TODD
Princess Elkhorn Coal Co.
H. A. TREADWELL
Chicago, Wilmington & Franklin Coal Co.
W. D. TURNBULL
Kennametal Inc.
WHITNEY WARNER, JR.
Warner Collieries Co.
E. C. WEICHEL
Hudson Coal Co.
JAMES H. WILSON
Salem Tool Co.
G. V. WOODY
Allis-Chalmers Mfg. Co.

Program

Monday, May 5

10:00 A. M.—OPENING SESSION

Opening of Convention: JULIAN D. CONOVER, Executive Vice-President, American Mining Congress.

Chairman: H. H. TAYLOR, JR., President, Franklin County Coal Corp.

New Developments for Coal Utilization

JOSEPH PURSGLOVE, JR., Vice-President, Research and Development, Pittsburgh Consolidation Coal Co.

Materials and Machinery for Coal Mines

CHARLES W. CONNOR, Administrator, Defense Solid Fuels Administration.

EDWARD T. KLETT, Deputy Administrator, Defense Solid Fuels Administration.

HAROLD A. MONTAG, Director, Mining Machinery Division, National Production Authority.

12:15 P. M.—LUNCHEON

Presiding: L. C. CAMPBELL, Vice-President, Eastern Gas & Fuel Associates, and Chairman, Coal Division, American Mining Congress.

Address—Businessmen in Politics:

THOMAS E. MILLSOP, President, Weirton Steel Co.

2:15 P. M.—STRIP MINING SESSION

Chairman: FRANK F. KOLBE, President, United Electric Coal Cos.

Overburden Blasting Techniques

JOHN L. ROMIG, Assistant Manager, Technical Division, Atlas Powder Co.

Road Construction and Maintenance

S. F. SHERWOOD, General Manager, Central Indiana Coal Co.

Rotary Drilling in High Overburden

Practices in Eastern Ohio:

J. S. HARMON, General Superintendent of Stripping, Hanna Coal Co.

Practices in the Anthracite Field:

TALHURST BUTLER, Central Pennsylvania Quarry Stripping & Construction Co.

2:15 P. M.—ROOF SUPPORT SESSION

Chairman: J. W. WOOMER, Mining Engineer.

Wet and Dry Drilling for Roof Bolting

Compressed Air Drills:

C. E. LINKOUS, Director of Safety, Island Creek Coal Co.

Rotary Electric Drills:

L. F. LUMAGHI, President, Lumaghi Coal Co.

Roof Bolting in Pillar Recovery

JAMES L. GILLEY, Mining Engineer, U. S. Bureau of Mines.

Overall Economies of Roof Bolting

DONALD B. SHUPE, Superintendent, Eastern Gas & Fuel Associates.

JOHN A. STACHURA, General Superintendent, Enoco Collieries.

2:15 P. M.—ANNUAL MEETING, AMC MANUFACTURERS DIVISION

Tuesday, May 6

10:00 A. M.—NEW DEVELOPMENTS SESSION

Chairman: CHARLES E. LAWALL, Assistant to Vice-President, Chesapeake & Ohio Rwy. Co.

Breaking Coal at Face with Chemechol

R. D. HEDREEN, Assistant Manager of Chicago Sales Office, E. I. du Pont de Nemours & Co.

Longface Mechanical Mining

Dosco Longwall Machine:

LOUIS FROST, Chief Engineer, Dominion Steel & Coal Corp.

Lobbe Coal Plow:

W. A. HALEY, Mining Engineer, U. S. Bureau of Mines.

Meco-Moore Longwall Machine:

A. B. CRICHTON, JR., Vice-President, Johnstown Coal & Coke Co.

The Samson Stripper:

RICHARD TODHUNTER, JR., General Manager, Barnes & Tucker Co.

Auger Mining Underground

A. J. OPPERMANN, Consulting Engineer, Uniontown, Pa.

10:00 A. M.—UNDERGROUND HAULAGE SESSION

Chairman: GEORGE R. HIGINBOTHAM, Vice-President, Consolidation Coal Co. (W. Va.).

Slope Sinking at Peabody No. 10 Mine

LYLE MORRIS, Division Engineer, Peabody Coal Co.

Modern Underground Track Haulage Systems

Main Line Dispatching:

WALTER R. KIRKWOOD, Chief Mine Inspector, Tennessee Coal & Iron Division, U. S. Steel Co.

Gathering and Service Haulage Operation:

B. M. NEEL, Assistant General Superintendent, Stonega Coke and Coal Co.

Underground Belt Conveyors

Factors Affecting Operating and Maintenance Costs:

A. E. LONG, General Superintendent, Clearfield Bituminous Coal Corp.

Central Shop for Belt Repairs:

W. A. HASLAM, Assistant to Vice-President, The New River Co.

12:15 P. M.—LUNCHEON

Presiding: CHARLES B. STAINBACK, Industrial Syndicate Manager, Westinghouse Electric Corp., and Chairman, Manufacturers Division, American Mining Congress.

Address—"Four Buckets of Paint":

DR. KENNETH McFARLAND, Educational Consultant, General Motors Corp.

2:15 P. M.—STRIP MINING SESSION

Chairman: GEORGE Roos, Vice-President, Philadelphia & Reading Coal and Iron Co.

Strip Mining in Deep Overburden

Bituminous Mining:

ARTHUR F. LEE, District Engineer, Truax-Traer Coal Co.

Anthracite Methods:

PAUL GODDARD, Vice-President, Carey, Baxter & Kennedy.

Stripped Land Rehabilitation

FRANK J. FORESMAN, Personnel Director, Pittsburgh & Midway Coal Mining Co.

Stripped Land Use Developments

THOS. C. CHEASLEY, Chairman, A.M.C. Land Use Technical Committee.

2:15 P. M.—CONTINUOUS MINING SESSION

Chairman: W. B. JAMISON, Vice-President, Jamison Coal & Coke Co.

Progress Review of Continuous Mining

BCR Coal Burster:

GERALD VON STROH, Director, Mining Development Committee, Bituminous Coal Research.

Goodman Mining and Loading Machine:

H. C. MCCOLLUM, Consulting Engineer.

Jeffrey Colmol:

FRANK R. ZACHER, General Superintendent, Christopher Coal Co.

Joy Continuous Miner:

MILTON H. FIES, Manager Coal Operations, Alabama Power Co.

Pillar Extraction with Continuous Machines

J. A. YOUNKINS, Assistant General Superintendent, Duquesne Light Co.

Wednesday, May 7

10:00 A. M.—SAFETY SESSION

Chairman: J. T. PARKER, Superintendent, Inland Steel Co.

Prevention of Fires to Underground Conveyor Belts

C. W. THOMPSON, Manager, National Mines Corp., Weirton Steel Co. Div.

Handling Man Trips from Portal to Working Sections

Man Trips with Belt Haulage:

E. D. CONAWAY, Engineer, Robinson & Robinson.

Man Trips with Rail Haulage:

F. F. STEWART, Superintendent, Jewell Ridge Coal Co.

Coal Dust Control Underground

R. EMMET DOHERTY, Engineer, Anthracite Institute.

10:00 A. M.—POWER AND MAINTENANCE SESSION

Chairman: E. R. McMILLAN, Manager, Coal Operations, Northwestern Improvement Co.

Centralized Lubrication for Coal Preparation Plants

R. M. JOHNSON, Vice-President, Blue Bird Mining Co.
W. H. CARTER, Master Mechanic, West Virginia Coal & Coke Corp.

Underground Power Transmission

URBAN F. TOUCHER, Chief Electrician and Master Mechanic, Union Pacific Coal Co.

W. R. WOOD, Electrical Superintendent, Berwind-White Coal Mining Co.

Maintenance for Continuous Mining Section

G. W. STUMP, Assistant Production Manager, Rochester & Pittsburgh Coal Co.

2:15 P. M.—COAL PREPARATION SESSION

Chairman: J. B. MORROW, Consulting Engineer, Alford, Morrow & Associates.

Heated Cloth Screening

JOHN E. DUNN, Allis-Chalmers Mfg. Co.

MILO W. SUMMERS, Vice-President, Westmoreland Coal Co.

Preparation and Recovery of Fine Coal from Slurries

JAMES P. BLAIR, Coal Preparation Engineer, Heyl & Patterson, Inc.

Dense Media Separation by Tromp Process

J. W. MACDONALD, Chief Engineer, Old Ben Coal Corp.

7:00 P. M.—ANNUAL BANQUET

Presiding: R. E. SNOBERGER, Executive Vice-President, Truax-Traer Coal Co.

Special Entertainment Feature—An evening with Victor Herbert.

of his talk is "Four Buckets of Paint," but does not deal with the topic of protective coatings for wood or metal.

Program Comprehensive

The Convention will be officially opened at 10 o'clock Monday morning. This opening session will be of wide general interest. What lies ahead for the industry in the way of new utilization developments and material procurement will be the central theme of the morning program.

Roof Support and Strip Mining will be the subjects taken up



Frank G. Smith
Chairman
Floor Committee

Luncheon Speakers



THOMAS E. MILLSOP, President of Weirton Steel Co. and Mayor of Weirton, will speak at the Monday luncheon on "Businessmen in Politics"



For the Tuesday luncheon Dr. KENNETH McFARLAND, Educational Consultant, General Motors Corp., plans an inspirational and humorous talk on Free Enterprise

at the two Monday afternoon sessions. Those interested in underground transportation will want to attend the haulage session on Tuesday morning to hear papers on belt and track haulage systems. Continuous mining will be the main topic in one of the Tuesday afternoon sessions. The other session of

the afternoon will have to do with stripping in deep overburden and stripped land rehabilitation and use.

At Wednesday morning's sessions Power and Maintenance, as well as Safety will claim the careful attention of every operating man.

(Continued on page 50)



Geo. R. Higinbotham
Consolidation Coal Co.
(W. Va.)



Frank F. Kolbe
United Electric Coal Cos.



W. B. Jamison
Jamison Coal & Coke Co.



Charles E. Lawall
Chesapeake & Ohio Rwy. Co.



E. R. McMillan
Northwestern Improvement Co.

Session Chairmen



J. B. Morrow
Alford, Morrow & Associates



J. T. Parker
Inland Steel Co.



George Roos
Philadelphia & Reading Coal & Iron Co.



H. H. Taylor, Jr.
Franklin County Coal Corp.



J. W. Woomer
Mining Engineer

THE *Speakers* at Convention Sessions

(Continued on pages 46 and 47)



Joseph Pursglove, Jr.
Pittsburgh Consolidation
Coal Co.



Charles W. Connor
Defense Solid Fuels
Administration

Coal Utilization — Machinery Allocation Monday Morning



Edward T. Klett
Defense Solid Fuels
Administration



Harold A. Montag
National Production
Authority

Strip Mining

Monday and Tuesday afternoons

(Photo not available)

Talhurst Butler
Central Pennsylvania
Quarry Stripping &
Construction Co.



John L. Romig
Atlas Powder Co.



S. F. Sherwood
Central Indiana Coal Co.



J. S. Harmon
Hanna Coal Co.



Arthur F. Lee
Truax-Traer Coal Co.



T. C. Cheasley
Sinclair Coal Co.



Frank J. Foresman
Pittsburg & Midway
Coal Mng. Co.



Paul Goddard
Carey, Baxter & Kennedy

Roof Bolting

Monday Afternoon

(Photos not available)

L. F. Lumaghi
Lumaghi Coal Co.

John A. Stachura
Enoco Collieries



C. E. Linkous
Island Creek Coal Co.



James L. Gilley
U. S. Bureau of Mines



Donald B. Shupe
Eastern Gas & Fuel
Associates



R. D. Hedreen
E. I. Du Pont de Nemours
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Richard Todhunter, Jr.
Barnes & Tucker Co.



Lyle Morris
Peabody Coal Co.



Walter R. Kirkwood
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U. S. Steel Co.

New Developments

Tuesday Morning



A. B. Crichton, Jr.
Johnstown Coal & Coke
Co.



Wilbur A. Haley
U. S. Bureau of Mines



Louis Frost
Dominion Steel & Coal
Corp.



A. J. Oppermann
Consulting Engineer



B. M. Neel
Stonega Coke and Coal
Co.

Underground Haulage

Tuesday Morning



A. E. Long
Clearfield Bituminous
Coal Corp.



W. A. Haslam
The New River Co.



Gerald Von Stroh
Bituminous Coal Research



H. C. McCollum
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Continuous Mining

Tuesday Afternoon



Frank B. Zachar
Christopher Coal Co.



Milton H. Fles
Alabama Power Co.



J. A. Younkins
Duquesne Light Co.



W. H. Carter
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Urban F. Toucher
Union Pacific Coal Co.

Power and Maintenance

Wednesday Morning

(Photos not available)

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Blue Bird Mining Co.

W. R. Wood
Berwind-White Coal Mng. Co.



G. W. Stump
Rochester & Pittsburgh Coal Co.



C. W. Thompson
National Mines Corp.
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Jewell Ridge Coal Corp.



R. Emmet Doherty
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Milo W. Summers
Westmoreland Coal Co.

Coal Preparation

Wednesday Afternoon



James P. Blair
Heyl & Patterson, Inc.



J. W. MacDonald
Old Ben Coal Corp.



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HOWARD L. YOUNG
President
American Zinc, Lead & Smelting Co.
President, American Mining Congress

The final session, Wednesday afternoon, deals with Coal Preparation. Topics to be discussed here are Heated Cloth Screening, Water Clarification and Dense Media Separation by the Tromp Process.

Discussion periods will be utilized to bring out additional information and experience on the topic at hand.

Entertainment Is Tops

True to the tradition that the entertainment at AMC conventions is the best, the Coal Miners Party on Monday night will start the week off with a bang. After refreshments on the terrace overlooking Lake Como at Cincinnati's famous Coney Island, miners and their ladies will move into the park's beautiful Moonlite Garden—where, in surroundings reminiscent of Colonial New Orleans, supper will be served. The fine meal will be followed

by dancing and entertainment.

In addition to an excellent orchestra, some of the best variety acts in the country have been engaged to make this an evening which will afford conversation on many a night shift through the year. Comedians, singers and dance teams will vie with one another for the applause of conventioneers. As if this weren't enough, all the fun and thrills of the vast amusement area will be wide open to help

coal miners banish the cares that infest the day and make the 1952 Coal Miners Party such a party as—"never was seen nor never shall be forgotten and must not be missed."

Baseball Night, Tuesday, will feature a ball game between the Brooklyn Dodgers and the Cincinnati Reds. The special "Mining Congress Section" will assure that the mining conventioneers will be able to attend in a group.

Climaxing the week, indeed the entire coal mining year, will be the Annual "Speechless" Banquet on Wednesday evening. Honored guests will be introduced but no formal addresses will be tolerated. This is an informal affair and will feature An Evening With Victor Herbert. Selections from six of his best-loved productions will be presented by a com-



R. E. Snobberger
Toastmaster



Cincinnati—a view from across the Ohio River

Entertainment



Earl Covert

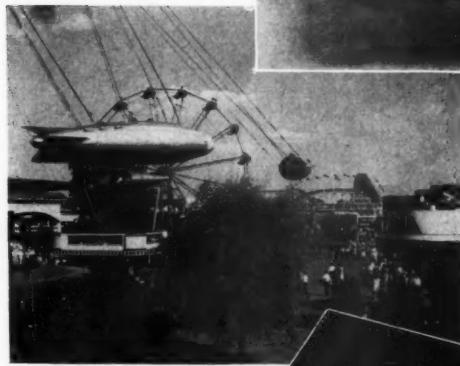
Stars of Victor Herbert Musicals who will thrill the banquet audience.



Kirsten Kenyon
and Guen Omeron



America's finest amusement park is the setting for the Coal Miners' party on Monday night.



pany of 60 stellar performers including Earl Covert, Kirsten Kenyon, the Choralaires, Guen Omeron, Bruce Amory and Ruth Bishop.

On the Distaff Side

Ladies who come to the Convention are, of course, welcome at all the business and social functions. But besides the Coal Miners Party and the Annual Banquet a special program has been arranged for their particular enjoyment. There will be a Welcoming Luncheon on Monday at the beautiful Restaurant Continentale in the Netherland Plaza Hotel. Later a tour of the Kroger Food Foundation laboratories should prove interesting and informative.

A drive through Cincinnati's scenic parks

followed by luncheon at The Copper Stallion, newest of Ohio's country restaurants, is scheduled for Tuesday. After lunch a bingo party has been arranged.

The Taft Museum—a picturesque 19th century home replete with historical tradition and full of priceless art treasures—will be first stop on Wednesday afternoon. Following a specially conducted tour of the museum, the ladies will visit the Rookwood Potteries, of international renown, situated atop historic Mt. Adams.

Advance registration has been strong, indicating a great turnout. However, there is still time to arrange to be there. Remember, Cincinnati, Ohio, May 5-7!

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At work or play, coal is your faithful servant! Own a car—a washing machine? Coal, as an ingredient of steel, is part of them. Enjoy reading the evening paper? Coal supplies the light. Lamps, TV, all home appliances depend on electricity generated chiefly by coal! Coal drives trains—heats millions of homes. And, almost all the good things you use every day are made in factories powered by *bituminous* coal!

So it's worth remembering, America's coal industry is the world's most efficient . . . America's vast coal reserves assure plentiful heat, light, power for centuries!

Responsible for choosing a fuel to power a factory—to heat a home or other building? Then consider the many important advantages of bituminous coal!

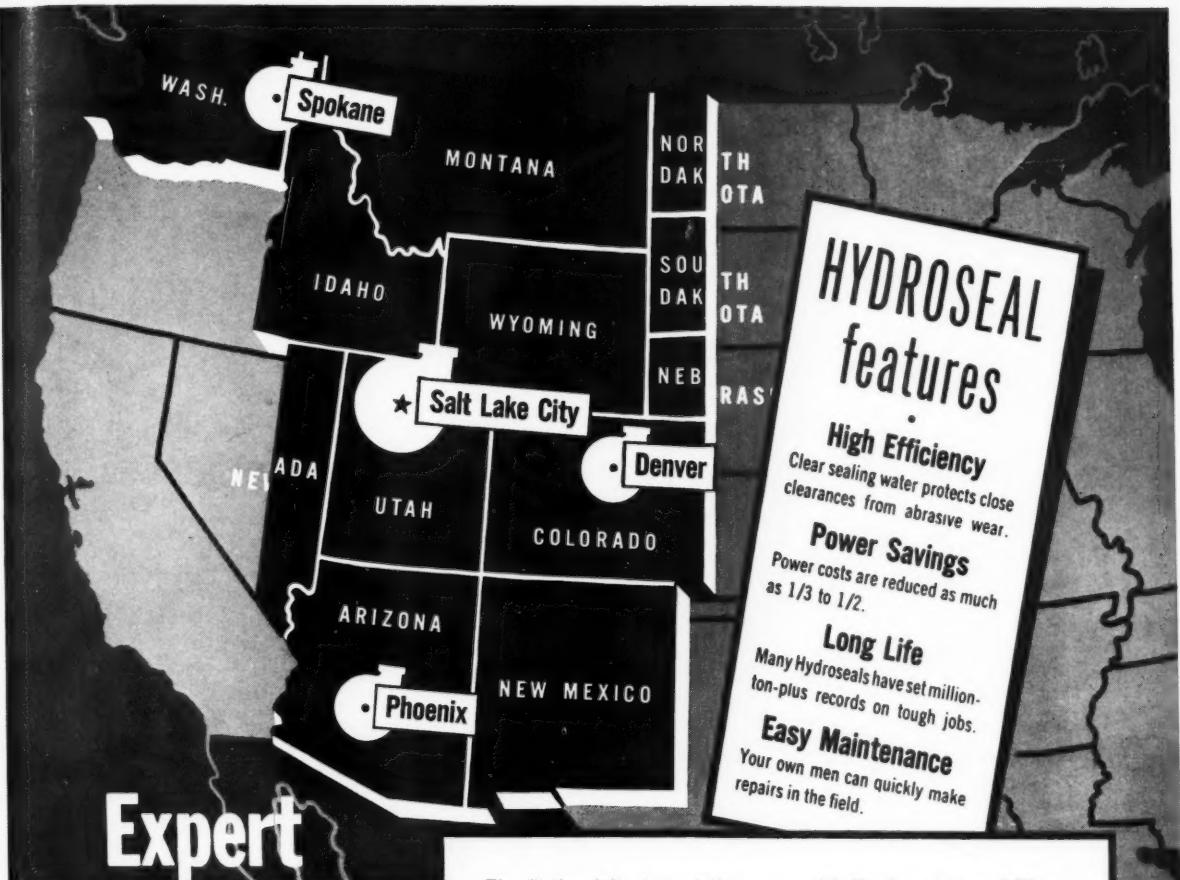
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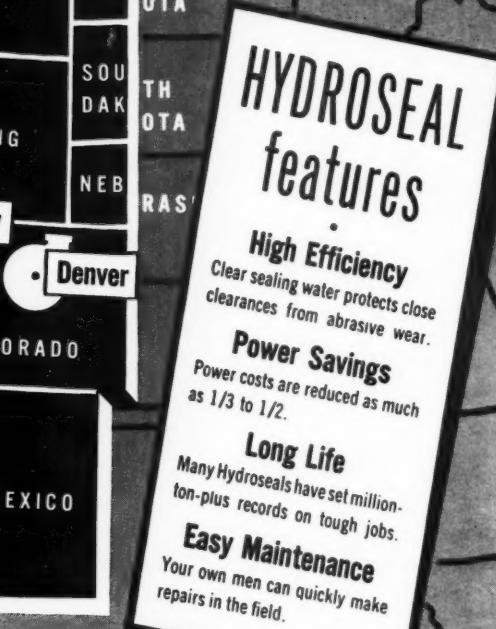
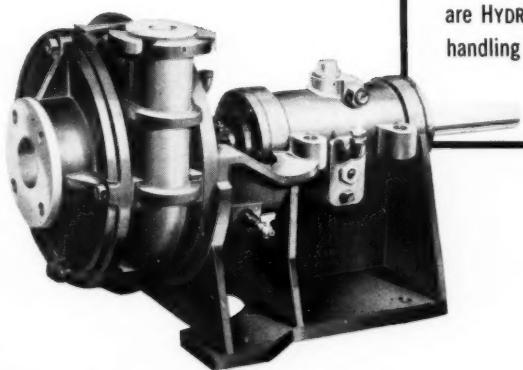
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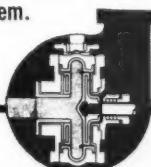


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*When considering a cleaning plant
remember this all-important fact:*

EVERY EXTRA TON PER HOUR



adds \$20,000 a year to profits

In spirited discussions of methods, machines and coal-cleaning theory, it's easy to forget fundamentals. But when all is said and done, this all-important fact is inescapable:

On every ton you lose to refuse, you lose three ways: The out-of-pocket cost of cutting, loading and hauling underground *plus* the cost of conveying, crushing, screening and cleaning above ground *plus* the income you would have had by shipping it.

Conservatively, at today's costs, just one ton an hour "less float in the sink" adds \$20,000 a year to profit. That's an 8% return on a quarter-million dollar investment. *Compared to the annual profit at stake, the additional cost of installing and operating a true Heavy-Media Separation plant is small potatoes indeed.*

How much more efficiently does true Heavy-Media Separation recover shipping-grade coal? Let's look at the record.

The test of a process is its performance at rated capacity on tough cleaning jobs . . . on enough tonnage from enough seams for a long enough period to supplant theory with solid fact. By that test, the efficiency of true Heavy-Media Separation is beyond question.

AMERICAN Cyanamid COMPANY

Built and building are 55 Heavy-Media Separation cleaning plants with a combined feed-rate capacity of 10,000 tons per hour. Scattered from Alberta to Alabama, these plants are on widely diverse seams. They clean widely different feeds under all sorts of operating conditions. Some are relatively small "package plants" under the watchful eyes of individual owners. Others are giant installations by the industry's largest operators.

Most significant, over 1000 tons per hour of Heavy-Media Separation capacity has been installed solely to clean middlings and refuse from other washers and from dumps. These plants operate commercially on what other methods lose to refuse!

Obviously, if true Heavy-Media Separation functions so efficiently on refuse and feed containing a high percentage of near-gravity material, there can be no question as to its ability to recover that last ton of marketable coal from less difficult feeds.

Heavy-Media Separation is no longer new or experimental. It is the tonnage-tested way to closely duplicate your washability curves in commercial operation. Before you decide on any separation method for a new cleaning plant or to supplement your present facilities, it will pay you to inspect operating Heavy-Media Separation plants . . . to make a comparative study of the better over-all grade and recovery . . . to compare capital and operating costs with the higher profits attainable.

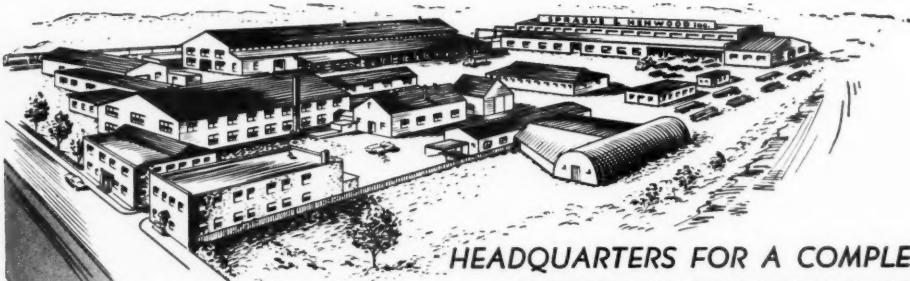
As Technical and Sales Representative for Heavy-Media Separation Processes, we stand ready to give you every possible assistance in making a realistic, profitable decision on your next cleaning plant. We can run carload tests on your coal in the Heavy-Media Semi-Commercial Plant at Stamford, Conn. Although we do not design or build plants, we can put you in touch with experienced engineering-construction firms who do, including builders of pre-fabricated plants with capacities up to 400 tons per hour. We will work closely with your staff or engineers of your choice in the design and initial operation of your Heavy-Media Separation Unit.

MINERAL DRESSING NOTES #18 "COAL PREPARATION"

This informative 36-page book, clearly and concisely explains the fundamental principles of the Heavy-Media Separation method. With photo-micrographs of medium samples from an operating plant, it shows how Heavy-Media Separation employs unique and exclusive applications of magnetomotive force to provide constant control, conditioning and recovery of the medium. It describes typical operating plants, contains test results, flow schemes and other new useful data. Write for your copy without obligation.



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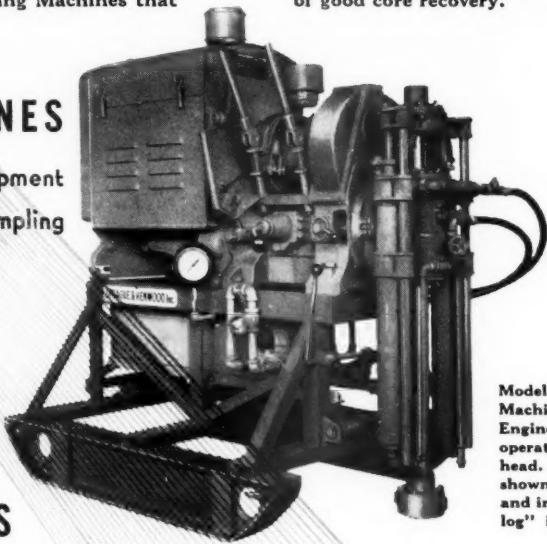
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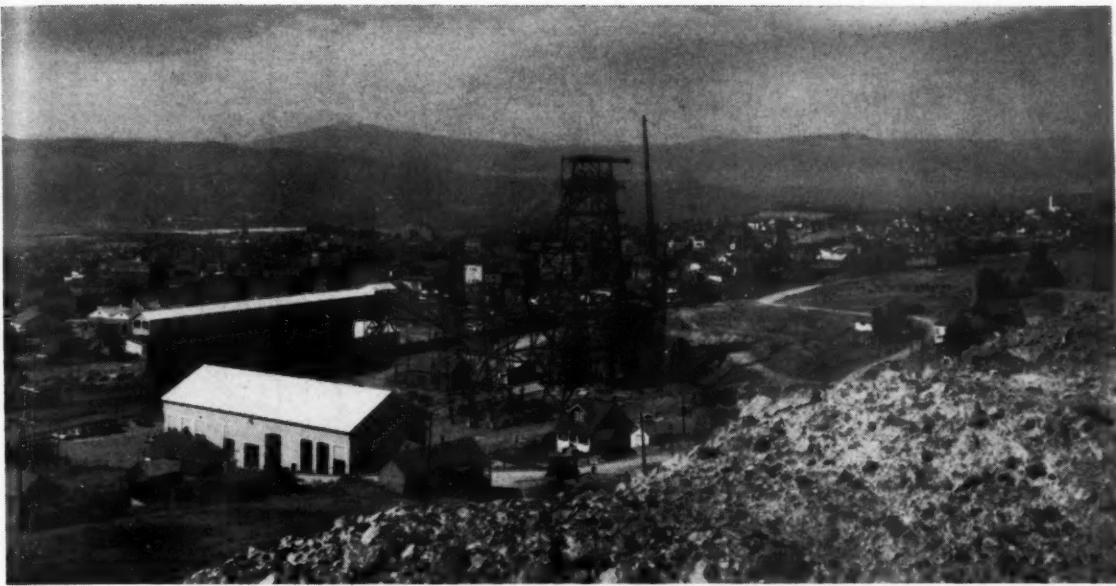
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The Kelley Shaft overlooks the city of Butte, Mont.

Concreting At the Kelley Shaft

Careful Plans, Well Executed, Produced Western Hemisphere's Largest Shaft

By **A. R. SIMS**

Assistant General Superintendent of Mines
and

LESTER BISHOP

Research Engineer
Anaconda Copper Mining Co.

FOR many years it has been known that many tons of low-grade copper ore existed in the Butte District of Montana, but as there was a large reserve of higher grade material easily available, little or no attention was given these tremendous low-grade ore deposits.

In 1945 the Anaconda Copper Mining Co. started an intensive development program to determine the quantity and extent of these low-grade ore bodies. Also, research work was started at the Anaconda Reduction Works to find a method of obtaining satisfactory recovery on this ore, which assays about 1.2 percent copper. A recovery of 20 lb copper per ton is expected.

About 130,000,000 tons of low-grade ore was proven to exist. Then a proper mining method, suitable shaft site, and a thousand and one other details had to be decided upon.

Heretofore, the size of the shafts in Butte, had been limited to three or

sometimes four compartments. These compartments are about 4 ft 6 in. by 4 ft 6 in. in the clear. A capacity of 2000 tons per 24 hr day was considered satisfactory. Skips, cages and all plant equipment were designed for that kind of production. There are some 55 of these shafts in Butte over 1000 ft deep. Some of them are over 4000 ft deep. They are all timbered, usually with 12 by 12 in. timbers on 5-ft centers.

The proposed Low Grade Development Project demanded a shaft capable of producing 10,000 to 15,000 tons of ore per 24 hr instead of 2000 tons. A fireproof shaft was imperative. Steel construction was considered, but as Butte mine water is highly acid and very corrosive, re-inforced concrete was decided upon.

Pre-fabricated concrete slabs were favored at first. After some experimental casting had been done, the idea was abandoned, as it appeared that

an economical method of installing monolithic concrete had been developed.

Favorable Site Chosen

The Kelley Shaft is named in honor of Mr. Cornelius F. Kelley, chairman of the Board of the Anaconda Copper Mining Co. He formally approved the plans for the Greater Butte Project on September 10, 1947.

The shaft site selected was chosen because geological cross sections through this area indicated that it was free from faults, veins, or other geologic structures that might cause ground movement in the shaft and consequent high maintenance costs. The site is favorably located with respect to underground pumping plants and to existing railroad facilities. Also it is far enough from proposed mining areas to insure safety from subsidence damage.

Muck with Clamshells

The Kelley Shaft, which has the largest cross sectional area of any shaft in the western hemisphere, is 38 ft by nine ft outside dimension, and 35 ft 2 in. by 6 ft 9 in. inside the finished concrete section.

In the sinking operation, temporary timbers were placed on 7 1/2-ft centers in the upper 90 ft of the shaft. Then the conventional five-ft centers used in Butte shafts were used. The wall plates and end plates were 10 by 10 in. and the centers were 8 by 10 in.

A trench hoe was used to muck out the first 12 ft of the shaft. Then a clamshell bucket was rigged up on the same machine, and the shaft was sunk to 23 ft. The temporary hoist, headframe and skips were then placed in operation and mucking was done with clamshells operating in the compartments next to the ends.

Three Gardner-Denver HMK hoists, mounted on a special steel frame are used to operate the clamshell. The two lower hoists are equipped with a mutual control and lift the clamshell by means of an equalizing bar. The third hoist mounted on top of the frame, controls the opening and closing mechanism. All three hoists are equipped with air brakes which are set when the throttles are in neutral position.

This mucking method was developed in Butte. The Riddell or Longyear method could not be used, as Butte shafts must be kept timbered very close to the bottom, often as close as five feet.

Bottom dump skips of 57 cu ft capacity are operated in the end compartments. These skips are turned at right angles to conventional installation to facilitate dumping the clamshell muck into the skip. Both skips are kept in the bottom during the mucking operation. Balanced hoisting was not used.

The clamshell picks up a load in the bottom and is hoisted to a point directly above the folding slide or chute. The chute is then dropped to the loading position, and the clamshell discharges directly into the skip.

Change in Plans

Drilling was all done with jackhammers, as this type of machine is best suited to Butte conditions. A

burned cut round was developed which actually broke 11 ft. Due to bad shaft walls, this round was discarded, and a "V" cut round was used. The average depth broken was six ft, using the "V" cut. Jack bits were used at first, but later Liddicoat bits were used with satisfactory results.

After sinking 104 ft, ground conditions were such that then it was decided to cut the size of the shaft from five compartments to three. The shaft was then sunk to 631 ft. The upper 90 ft of shaft was then concreted. After this job was completed, enlarging the shaft to full size was started, using overhand stoping methods. This was not satisfactory due to bad walls, so underhand stoping was tried with excellent results.

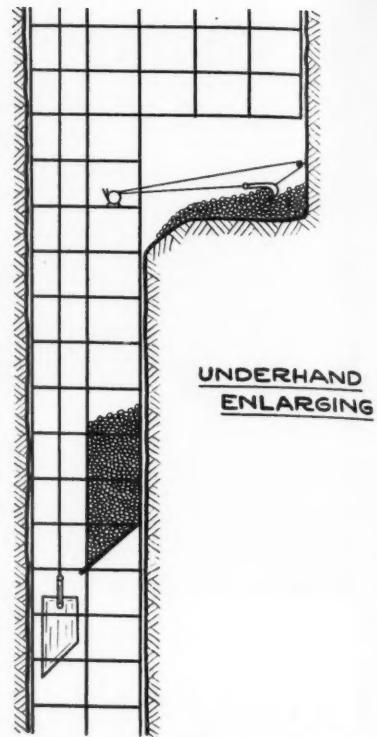
Chutes for the muck were installed at approximately 60-ft intervals, and jackhammer rounds six ft deep were used. The muck was scraped into the chute using a 7½-hp double drum air slusher with a 36-in. scraper.

Overhand stoping is again being used with very satisfactory results in the section between the 1300 and 600 levels, where ground conditions are very good. Stoper drills are used for this work.

Regular shaft timber and hanging rods are used on all enlarging operations.

During the time the shaft was being sunk to the 631-ft mark, a cross-cut was driven from the 1500 level of the Mountain Con Mine, a distance of approximately 300 ft, to a point directly below the Kelley Shaft, and a two compartment shaft raise was started. This raise was driven a total distance of 730 ft and holed perfectly.

The second main haulage level, the



Three compartments were sunk first and widened to five by underhand stoping methods

1300, was also driven from the Mountain View Shaft, some 3000 ft, during this same period, and a two compartment shaft raise was driven 146 ft to hole into the Mountain Con 1500 level.

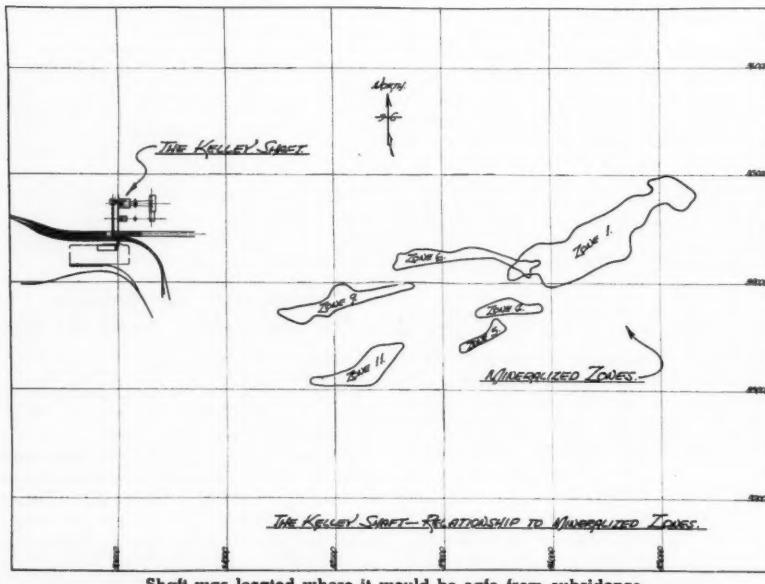
A cross-cut from the High Ore Mine 2400 level was advanced approximately 1600 ft and a shaft raise full size is now being driven from this level. This raise is now up 250 ft (September 30, 1951) and will hole through at 669 ft.

A cross-cut is also being driven from the 3000 level of the Steward Mine and a shaft raise 573 ft high will connect to the High Ore 2400 level.

Concreting Method Unusual

Perhaps the most interesting and unusual feature of the Kelley Shaft is the concreting operation. The procedure was:

1. To sink or raise two or three compartments of the shaft.
2. To enlarge to full shaft size by overhand or underhand stoping, timbering with regular ten by ten-in. shaft sets on five-ft centers, using hanging rods on all shaft sets.
3. Start at any convenient point, remove shaft timber.
4. Install reinforcing rods.
5. Install steel forms.
6. Pour concrete.



Shaft was located where it would be safe from subsidence

The concreting operation proceeds upwards in all cases. When the pouring of a set is completed, the next set of timber is removed and reinforcing rods are set in place. Then the lower form is dismantled and hoisted into position for the next pour.

Design and Build Forms

Steel forms used were designed in the Mechanical Department and built in company shops. They are made of $\frac{1}{4}$ -in. boiler plate on a framework of three by three-in. angle bars and are five ft high. The form for each compartment is made in four sections, each section weighing 800 lb. A complete set of forms for a five foot pour weighs seven tons. Three complete sets of forms are used. Thus when a complete cycle is made in about 22 hr the form is on the cement for a minimum of 30 hr.

Each section of the form is equipped with a small hinged door with beveled edges. When locked in closed position with steel wedge pins to the adjoining section, these doors make a very rigid yet easily removed form.

The openings in the shaft walls between compartments are made by using a similar type of hinged door with wedge pins. These forms are bolted to the "tanks" which form the compartments. Four one-in. pipes are set in position to form bolt holes through the concrete beams or centers. These holes are used to bolt the guide supports to these concrete centers.

Forms are handled in the shaft with the clamshell hoists.

The concrete is batched at an ultra-modern central batching plant where aggregates are handled in carload lots. Cement is delivered to the plant in bulk in boxcars and unloaded with a 40 hp Fuller-Kinyon pump, capable of unloading 150 bbls of cement per hour.

Each batch of aggregates is weighed and the amount of water is carefully measured. The aggregates are dumped into Ransom mixer trucks and mixed as they are being hauled



Steel concrete forms were designed in Mechanical Department and built in surface shops

to the job. Six sacks of cement to the yard of concrete are used for all shaft, skip pocket and station work. The mix is; cement—564 lb; sand—1580 lb; gravel—1650 lb. Fifty gallons of water are used per yard of concrete. This is more than is used on surface construction as we have found from experience that some water is lost in sending the concrete through a vertical pipe line.

At the shaft the mixer discharges directly into a hopper which acts as a surge tank. From the hopper the concrete passes through a small control gate into a six-in. pipe line in the center compartment of the shaft. This pipe line discharges into a surge or baffle tank some distance above the pour. From this surge tank the concrete is discharged into a four-in. pipe. A six-in. special concrete placing hose, 20 ft long, telescopes over the bottom length of a four-in. pipe. This hose is raised or lowered by means of one of the clamshell hoists and acts as an "elephant trunk" in discharging the concrete at any desired point about the perimeter of the shaft. Vibrators are used to eliminate air pockets and bubbles and to insure a uniform texture of concrete.

The complete cycle of the concreting operation is as follows:

- (1) Remove complete set of timber. (Requires about four hr as all old timber must be hoisted to surface.)
- (2) Place pre-fabricated reinforcing steel. (Takes about four hr.)
- (3) Hoist and align forms. (Takes about 10 hr. Final alignment of each form is checked by an engineer before concrete is poured.)
- (4) Pour 32 to 56 cu yd of concrete. (Takes about four hr.)

Total time of cycle is about 22 hr.

Walls are poured to ground in all cases except at ring dams.

Thus the irregular section of the wall rock surface forms a perfect bearing for the concrete throughout the entire length of the shaft. The minimum thickness of the concrete shaft walls is 16 in.

Pre-fab Reinforcing Steel

Reinforcing steel used in the walls of the shaft are $\frac{1}{2}$ in. and $\frac{5}{8}$ in. diam rods. These are pre-fabricated on surface into convenient units that are easily handled on the deck of the sinking cage. Eight hundred lb of rods are required per linear foot of shaft. Vertical rods are on 12-in. centers and horizontal rods are on six-in. centers. The rods in each unit are spot welded together. There are approximately 2200 welds in a complete five-ft section of reinforcing.

Guide supports used in side and end walls of the service cage compartment and in the end wall of the north hoisting compartment were designed by the Mechanical Department. This guide support is a $\frac{3}{4}$ by 2-in. steel bar, three ft long, the center portion of which is welded to a box of 12 gauge steel seven by nine by $3\frac{1}{2}$ in. deep. This assembly is set in the concrete walls on 30-in. centers. Guides are fastened



Unique design of center forms saves concrete, permits communication between compartments

to these supports by means of "J" or hook bolts. Lateral adjustment of the guide is made by sliding the hook bolt along the $\frac{3}{4}$ by 2-in. horizontal bar. Vertical adjustment is obtained by starting the bolt holes in the guides.

These guide supports are so designed that the service cage compartment can be made into two skip ways each 6 ft 6 in. by 6 ft 9 in. by simply attaching a steel divider beam to them. If this were done, another service shaft would be necessary. A site for this shaft has been selected about 140 ft south of the present shaft site.

The guide supports used on the concrete centers are made of cast steel which are bolted to the centers. Guides are fastened to these supports in the manner described above.

Water Problems Solved

Ring dams have been put in every 100 ft to take care of a small amount of water that seeps into the shaft area. Openings, two by four ft, are left behind the concrete shaft wall which is otherwise poured to ground throughout the entire length of the shaft. A 3-in. pipe-line is installed inside of the concrete wall on each side of the shaft. This line connects these ring dams.

At the time ground trouble developed in the shaft (at 104 ft) it was decided to try pressure grouting to seal off the small amount of water that was seeping into the shaft along numerous minute cracks and parting planes. By the trial and error method,

holes were placed 12 ft from the shaft wall on seven-ft centers about the entire perimeter of the shaft. Forty-six vertical holes averaging 300 ft deep were drilled with diamond drills and three carloads of cement were used in grouting these holes.

After a hole was drilled a "grout packer" was installed about 50 ft above the bottom of the hole. Grout was introduced at varying pressures, up to 200 psi. When a hole refused to take $\frac{1}{2}$ cu ft of grout in a period of 15 min, pumping was stopped, and after the cement had set, the "packer" was moved up in the hole another 50 ft and the process repeated.

Grout was mixed in various proportions depending upon the "acceptance" of the hole. Where cracks in the ground had to be sealed, four cu ft of water to a sack of cement, the usual mixture, proved to be too thin. Proportions would then be varied to 3 to 1; 2 to 1 and even 1 to 1 until the cracks were sealed. Sawdust was also used in the grout mixture if the cracks were large. When grout was forced into the shaft, it at once became apparent, and wooden wedges, oakum or rags were used to stop up the cracks. Guniting the shaft walls was also an effective means of stopping up larger cracks.

Operations Summarized

Over 5000 cu yd of concrete have been poured in the Kelley Shaft to date. All this material has passed through a vertical pipe-line from sur-

face to the point of pour. There has been no separation of aggregates. Concrete bulkheads have been poured in the Butte mines where the concrete has traveled 2860 ft through a vertical pipeline, with no separation of aggregates.

Concrete poured into a vertical pipeline that has an open end discharge, apparently attains its maximum velocity of approximately 70 fps in the first 200 ft. The observed time for concrete to travel down 2860 ft of vertical pipe-line was 40 sec.

In Butte ground, sinking a small cross-section, and then enlarging to full size is more efficient than sinking full size.

Whenever possible, shaft raising is much more efficient than shaft sinking.

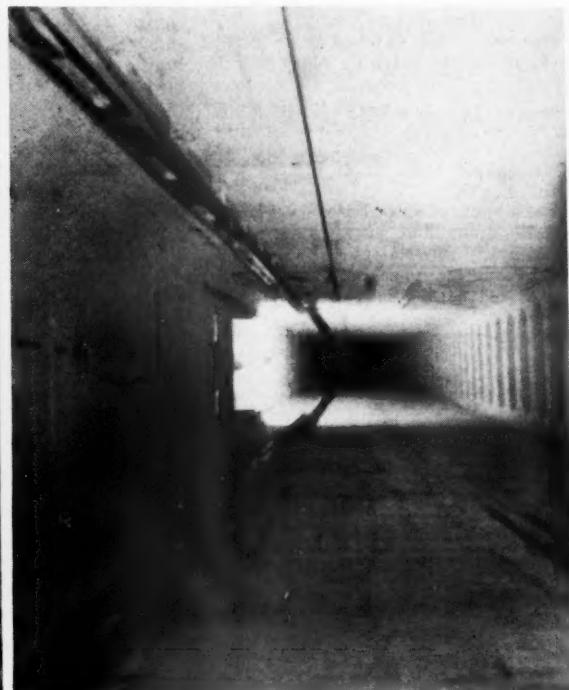
The effectiveness of clamshell mucking is entirely dependent upon ground conditions. Timbering close to the bottom, necessary in Butte, makes clamshell operation difficult. The presence of small slips and parting planes, makes for very large boulders, not easily handled with a clamshell.

Fixed removable forms are necessary where only one set of timber can safely be removed at a time.

The completed shaft is the result of much planning and of plans well executed. The finished shaft is a thing of beauty, and it will well serve the purpose for which it is to be used. It is so constructed that it will give many years of service, with a very minimum of maintenance expense.



(Left) Concreting proceeds upwards; when set is poured, timbers above are removed, reinforcing steel placed and forms hoisted to new position. (Right) Looking down the completed concrete lined shaft

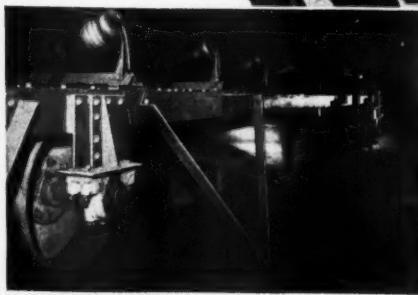


How does U. S. Rubber's twisted belt handle wet ore?



(right) **GENERAL**
VIEW of belt carrying
iron ore from crushers
to stock pile. (Mather
Mine, "B" Shaft of
the Negaunee Mine
Co., operated by the
Cleveland Cliffs Iron
Co., at Negaunee,
Mich.)

BELT BEING TWISTED
as it leaves vertical gravity
take-up before running
over return idlers.



RETURN STRAND
of belt being twisted
before reaching tail
pulleys.

PRODUCT OF



This belt is twisted behind the head pulley to make the clean side of the belt run against the return idlers, preventing wet iron ore from building up on them. The belt is twisted again before it reaches the tail pulley, so that the load is placed on the carrying side of the belt. Installed at a mine in Michigan's Upper Peninsula, this U. S. Matchless belt is 1425 feet long, 36 inches wide. It is used to stockpile ore above ground.

United States Rubber Company engineers have the research facilities and the experience that enable them to build the right kind of belt for your needs. They are specialists in reducing haulage costs and raising output. Write to address below.

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The pit is down 225 ft in the area on the left. Overburden is removed in 40-ft lifts

Deep-Mine Stripping in the Anthracite Field

**Haulage Units Become a Necessity as Strip Pits Grow
in Size and Depth**

By **PAUL GODDARD**
Vice-President
Carey, Baxter & Kennedy

DEEP-MINE stripping is a term rather difficult to define. There are no hard and fast rules that can be applied to any particular project which would place it definitely in that category. Size and type of the equipment used, ratio of overburden to coal, depth and nature of the overburden, and thickness of the vein, as well as the locality in which the operation in question is located, are all determining factors. As the shallow, low ratio stripplings become depleted, and that point is rapidly being reached, it becomes more and more important to plan progressively larger, deeper and higher ratio operations. Pits 2000 ft or more in width and reaching maximum depths of well over 300 ft are not at all uncommon in the An-

thracite Field today. On projects of this scope, even the largest draglines in use are no longer economically practical and haulage equipment of one sort or another must be used for the removal and disposal of the overburden. Such operations are then truly deep-mine stripplings.

Anthracite Stripping Rises 138.1% in 12 Years

The growth of production from strip mining in the Anthracite Industry has been little less than phenomenal. Commercial production arising from strip mining increased from 4,869,000 tons in 1938 or 11.3 percent of the industry total, to 11,592,000 tons or 27.4 percent of the total in 1950, a gain of

138.1 percent in 12 years. If this production ratio is to be maintained in the future, deep-mine stripping must of necessity take a permanent and important place in the industry.

The Greenwood Forty-Foot Mammoth Stripping on the property of The Lehigh Navigation Coal Co., at Tamaqua, Pa., is a deep-mine stripping operation. It offers an example of an unusually thick vein which due to its location in the southern tip of the anthracite field, was subjected to pronounced folding and distortion. The Mammoth Vein normally is approximately 50 ft thick and near the outcrop lies on a pitch of about 45°. As the depth increases the folding and distortion occurs, resulting in an anticinal formation known as the Forty-Foot Vein, which in places has a thickness of 40 ft and in the fold area reaches a thickness of 100 ft at times. The Primrose Vein lying parallel to the Mammoth is also included in the stripping area. Such conditions lend themselves quite favorably to extensive deep pit planning. The section now under contract has been producing coal since January, 1946, and calls for the ultimate removal of 41,000,000 cu yd of unclassified excavation with an expected commercial coal recovery of 6,000,000 tons. When the stripping has reached its final limits it will have a vertical depth of 700 ft. The area covered is about 102 acres and is roughly 3000 ft long by 1600 ft wide.

Planning Important

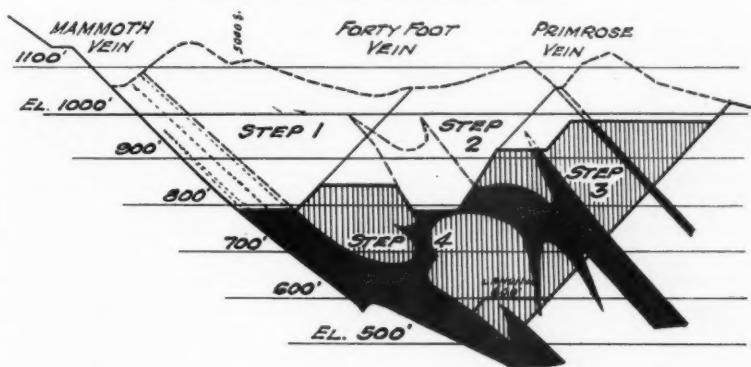
Before undertaking an operation of this magnitude much detailed planning study was necessary. The thoroughness with which this was done is noteworthy. Detailed information

covering every phase of the proposed stripping, available to all bidders, was indicative of this thoroughness. Accurate determination of the ratios of coal to rock and clay was important to both the coal company and the interested bidders. This was accomplished by careful plotting of sections at close intervals. Such sections furnished graphic records of the formation and location of both the coal and overburden. Numerous diamond drill holes, both vertical and angled, as well as many churn drill holes made possible such records. Underground mine data also served as an important guide in checking the accuracy of drill data and in arriving at a fair estimate of the percentages of vein material still remaining. A large percentage of all deep-mine stripplings in the Anthracite Field have been previously mined by underground methods. The percentage of vein depletion from such mining varies from 40 to 90 percent depending on the thickness and pitch of the vein and the nature of the roof.

To provide for as nearly a uniform flow of coal as possible throughout the duration of the operation, stripping was planned in a series of steps engineered so that the removal of overburden from each step would release a body of immediately recoverable coal. In an operation of this size, such planning is an economic necessity.

It has been the experience of the contractor on the job, as well as of the coal company, that as work progresses numerous minor changes in the original plans become necessary. Improvements in excavating and hauling equipment, changing market demands and long periods of abnormal weather make these alterations unavoidable. In general, however, the work has progressed in accordance with the original plan in respect to

LEHIGH NAVIGATION COAL CO.
TYPICAL SECTION - FEBRUARY 1952



Section showing sequence of mining and present status of operations

both continuity and time schedules. Since the start of the job in 1945, slightly over 19,000,000 cu yd of clay, rock and coal have been removed. The pit has now reached a depth of 325 ft. Plans call for the next 225 ft of vertical depth, or a total of 550 ft, to be accomplished without any radical changes in the present method of operation other than the increasing of some short haul grades in the pit to 10 percent. The final 150 ft of depth, almost all coal, may be removed by a 9-W Bucyrus-Monighan dragline carrying a 200-ft boom. This would eliminate the necessity of equipment working in the deepest and most restricted sections of the pit.

Equipment Used

Terms of the contract call for the complete removal of overburden and coal within 12 years from the start of the work. Securing of the proper type and amount of equipment required to meet this schedule was

quite a problem in procurement. This was especially true in view of the shortages and restrictions resulting from the war. The following equipment has proved to be adequate to meet all requirements:

- 2-170-B Bucyrus-Erie 6-cu yd Electric Shovels
- 1-120-B Bucyrus-Erie 4-cu yd Electric Shovel
- 1-54-B Bucyrus-Erie Combination Shovel and Dragline
- 10-42-T Bucyrus-Erie 9-in. Churn Drills
- 34-20-cu yd Diesel-driven Rear Dump Trucks
- 2-Model D-8 Caterpillar Tractors
- 1-Model 12 Caterpillar Motor Grader

These represent only the necessary loading, drilling, hauling and road maintenance units. Auxiliary units such as electric welders, air compressors, service trucks, etc., are much the same as required on all stripping operations.

Strip 21 Hours a Day

Excavation work was started in 1945. Before this, however, a crop cut had been taken to a depth of about 70 ft. This was dragline work with most of the overburden cast on the low side of the cut; necessitating its removal as part of the first step in the haul operation. Stripping of overburden is done on three seven-hour shifts starting at 7:00 a. m. Shovel-cut benches in the pit are 30 ft high and a minimum of 100 ft wide which provides ample turn-around space for the trucks and permits the spotting of two trucks at each shovel. The 170-B six-cu yd shovels are used for the loading of overburden only. In rock where blasting has produced satisfactory breakage, three dippers are required to load a 20-yd truck. This payload represents 12½ yd of material in place. The 120-B four-yd shovel is used for loading both overburden and



Because of limited area waste dumps must grow up—not out



Mine haulage roads must take more abuse than public highways

coal, depending on working conditions. The 54-B shovel is used mainly for loading coal which is done on a single or double shift basis, as the demand requires. An average of about 3000 tons per day represents normal coal output and must be balanced against the overburden output of the shovels of about 13,000 cu yd per day. All coal is hauled to a rough-cleaning plant located just outside the pit limits where the coarse rock is removed by hand as it passes over a picking table. It is then run through two sets of rolls and is crushed to five in. and under. The coal is discharged from the cleaner plant into trailer trucks and hauled one mile to the final preparation plant.

Use 0.72 lb Explosive Per Cu Yd

Ten drills using nine-in. bits and working three seven-hour shifts per day are required to provide sufficient broken material ahead of the loading shovels. Drill holes are staggered

and are spaced on 18 to 20-ft centers depending on the nature of the rock. All holes are drilled to a depth of 35 ft which provides sufficient bottom breakage for 30-ft lifts. Records covering all drilling done over a three-year period between 1946 and 1948 inclusive, show an average of 38.1 ft of bore hole per drill per seven-hour shift. The average footage drilled per bit before resharpening, varies from 10 ft in hard sandstone to 75 ft in shale and soft slate. Holes are carefully located and plotted by the engineers to prevent overlapping or poor spacing between succeeding shots. Detailed records of the strata cut are kept by each driller and are used by the chargeman in determining the proper load for each hole. In the five-year period, 1946-1950 inclusive, 11,303,782 lb of explosives were used and produced 15,672,153 cu yd of blasted material, or 0.72 lb of explosive per cu yd of rock. Various types and strengths of explosives are used depending on the

nature of the material to be broken. Generally speaking, however, the equivalent of 40 percent ammonia-type dynamite is used. Cartridges are 7½ in. by 20 in. and weigh approximately 50 lb each. The stemming used in the holes is fine material hauled in by truck from a nearby refuse bank.

Sharpening of the bits is done by a Model 12 Bucyrus-Erie bit sharpener located in a shop outside the pit limits. Drill bits are heated in an oil furnace to a temperature of 1800° F, then forged to shape by an electrically-driven hammer. After sharpening is completed and the bits are cooled, they are again heated to a temperature of 1500° F then quenched in water to provide proper tempering. Twenty-five to 30 bits can thus be processed by a two-man crew each seven-hour shift.

Need 70% Truck Availability

The transportation and overburden disposal problem, while more or less typical of all haul operations, is unique in that to the limited area and unusual depth of the pit, there is no possibility, for some time to come, of back-filling. The dump, all of which must be located outside the excavation limits, becomes phenomenal in size. Its area is limited by existing industrial installations. The necessary volume of disposal room must be acquired by building up the height of the dump rather than extending it laterally. All grades, on the dumps as in the pit, are eight percent. Lifts 50 ft high have been found to be quite satisfactory. Truck energy required to elevate the material is held within reason, and the problem of unplugging and levelling at the dumping point does not become too burdensome. One D-8 bulldozer working part time accomplishes this. Adequate lighting for night operations is furnished by portable floodlights.

To provide for the required excavation removal, about 70 percent, or 24 of the 34 available haulage units must be kept in operation at all times. A complete greasing and oil-change is given each truck after 80 hours of service. This is done in a two-stall, Truck Servicing Building located just off the main haulage road between the pit and the dump. Bulk storage capacity for 6000 gal of motor and hoist oil, and 16,000 gal of fuel oil is provided. Both motor oil and fuel oil are fed to the trucks under pressure to avoid delays in servicing.

All major repairs and overhauling are done in a Truck Repair Shop. This building is 166 ft by 48 ft and is high enough to permit truck bodies to be raised to their full height. An overhead rail carrying chain blocks runs the full length of the shop. Two

(Continued on page 72)



Deeper strip pits highlight the need for well planned and efficient operations

Drilling in Northern Minnesota



These miners have completed a shift in the mine reputed to contain the hardest drilling ore in the world

Rock and Hard Ore on the Mesabi and Vermilion Ranges Challenge Best in Equipment and Techniques as Constant Experiments Seek Reduced Costs

By EARL M. HOLMES

Assistant Superintendent
Oliver Iron Mining Co.

THERE are some interesting and many times costly and troublesome drilling problems on the Mesabi and Vermilion Ranges of northern Minnesota. The material to be drilled varies from the soft limonite, hematite and taconite of the Mesabi Range through greenstone, jasper and hard ore of the Soudan Mine. The Soudan jasper is reputed to be the hardest rock regularly drilled in any commercial operation in the United States, and the hard ore with which it is associated is only slightly less hard.

The soft ores of the Mesabi Range are drilled with light-weight hand-held drill machines using twisted auger drill steel. The average overall drilling rate is about 25 fph. Sharpened and tempered auger drills average about 25 ft between sharpenings. If the cutting and gauge edges are coated with stellite, the footage is increased four times to about 100 ft of drill hole between sharpenings.

The Mesabi Range underground mines with which the writer has been associated have had little drilling in

taconite since the introduction of tungsten carbide insert bits, and that little has been done with detachable steel bits. If any large drilling programs develop, tungsten carbide insert bits will be tried. One of the neighboring mines cut their taconite drilling cost in half by changing from detachable steel bits to tungsten carbide insert bits. Another mine made extensive tests between detachable steel bits and one-use bits. They found that the one-use bits would increase drill costs by about 30 percent due to rod breakage and difficulty of removing bits from the rods.

The hard ore of the Soudan Mine is only slightly less hard and has nearly the iron content of pig iron. This is a premium lump ore and 100 percent of the product is used as an open hearth feed ore. The story is told that at one time it was customary to leave one member of the drill crew with his finger on the breast to show the drillers of the following shift where the hole was being drilled that day. A retired General Superintend-



Headframe of Soudan Mine No. 8 Shaft

ent once said that back in the days of solid forged steel a single machine used 164 pieces of steel to drill 16 in. on the day shift, while 178 pieces of steel were used on the night shift to drill 18 in. of hole with the same machine. This is just over 10 pieces of steel per in. of hole.

Hardness Varies

Soudan ore is practically pure hematite, very fine grained and dense with few parting surfaces. It is all hard but wide variations of hardness are often encountered in adjacent holes,

and even in a single drill hole. This ore is found in a number of long, narrow, irregularly shaped high grade ore bodies contained within a low grade iron bearing formation, with an average dip of about 81 deg to the north. The low grade ore formation or jasper is composed of alternate bands of hematite and silica, each a fraction of an inch thick, intimately knit together by complete re-crystallization, and is so hard that drilling it is avoided wherever possible. The rock is popularly called *Greenstone* and is composed of highly metamorphosed schists of ancient acid and basic flows, with more recent intrusions and much folding and faulting.

This mine has been of much interest to geologists from all over the world. Also it has been a testing ground for much drilling and blasting equipment and supplies. Recently laboratory technicians of a large explosive manufacturer spent nearly four weeks experimenting at the mine and as a result it is now possible to space holes farther apart and increase the tons of ore per foot of drill hole by 28 percent. In 1939 tests were made with jet piercing, using oxygen and acetylene. This proved too costly and created serious ventilation problems. Last year a new test was made using an arc welding machine and an oversized electrode and this also resulted in failure.

Drilling in the greenstone presents very few problems. Tests have been made with inserts and other types of bits. Best results when drifting were obtained with Jumbo mounted 3-in. drifters with 48-in. feed, and 3½-in. stopers with 18-in. steel changes while raising in rock. In both cases, detachable steel bits are used which drill from 14 to 46 in. per use. They average about 41 in., at a cost of about one-half that of drilling with insert bits.

Lighter Drills Better

As stated before, drilling in jasper is avoided whenever possible, but nevertheless some drifts and raises have to go through jasper. A five by five-ft raise was planned to go up through 240 ft of jasper so hard that a 3½-in. stoker shattered tungsten carbide bits in a few inches, therefore they were using steel bits. A 2½-in. stoker was then secured and tungsten carbide insert bits were used with the result that the footage of hole drilled per hour was increased just over three times, and the cost of bits per foot of hole was cut almost in half. The same results have been secured in drilling of drifts in jasper where previously 3-in. drifters were used with steel bits, now 2½-in. or 2½-in. drifters are used with tungsten carbide insert bits.

Since 1884, ore drilling has always been the most costly mining function at the Soudan Mine. Early in the

nineties, diamond drills were used to drill blast holes, but due to the rising cost of diamonds, it was discontinued at the turn of the century. Up to 1935 forged steel was used. Records show that 2770 lb of steel were transported from the drill shop down to the stopes and back again to drill six ft of hole.

In 1935, extensive tests were made with detachable steel bits, which led to the development of the so-called jasper bit which was much heavier and had a 105 deg cutting angle. The adoption of these bits just about doubled the drilling of a machine—up to 12 ft of hole per shift. It was found that much better results were secured by using a three-in. drifter rather than any of the heavier machines.

Diamond Drills Tried Again

In 1939 tests were started again, drilling blast holes with regular exploration diamond drilling equipment. This continued with improvements in machines and diamond impregnated

Holes are drilled from six to 20 ft deep, the drill machines working three shifts per day. Each driller has his own bit box containing about 15 bits which are sand blasted on a rotating jig, gauged and returned to the mine during the driller's off shifts. Complete records are kept of each bit's drilling performance, life and number of sand blastings.

Experiment With T-C Bits

Due to scarcity of supplies of satisfactory diamond fragments and increasing labor costs, the price of core bits has steadily increased. Repeated efforts have been made to drill this ore with tungsten carbide bits since their introduction. One of the first manufacturers of tungsten carbide bits brought in eight bits to test, shattering all eight in 18 in. of hole at a bit cost of about \$80 per ft of hole. He left to develop his product for softer ground, and has never returned for another test. Only a year and a half ago a representative of



Five ft per shift was considered good progress for percussion drilling in Soudan Mine stopes

coring bits until 1945 when this equipment was improved to the point where these machines were drilling about 24 ft per shift or double the amount drilled with the drifters and detachable steel bits. It was found that the best results were secured with drill machines that developed about 1200 rpm and a pressure of about 1700 psi.

Up to the present time about 90 percent of the blast holes in ore are drilled with air operated, screw feed, rotary coring drills using diamond impregnated EXT core bits. This equipment averages about four ft of 1½-in. hole per hr, and about 3 ft per bit between sand blastings. It has been found that finer mesh diamond fragments can be used when bits are drilling the harder fine grained ore.

another large bit company, positive he had all the answers, brought in a 30 lb drill machine and four 1½-in. tungsten carbide bits. These four bits shattered in ten in. of hole at a bit cost of about \$72 per ft of hole.

New Combination Promising

Even though the diamond impregnated core bits were the best known method of drilling this hard ore, the drilling costs were so high that a constant search was carried on for a better method. Just a few months ago a combination of machines and bits was found that gives promise of cutting the cost of ore drilling by about 35 percent.

Core drills, a 2½-in. drifter and a 2½-in. column-mounted reverse feed stoker were used in competition in

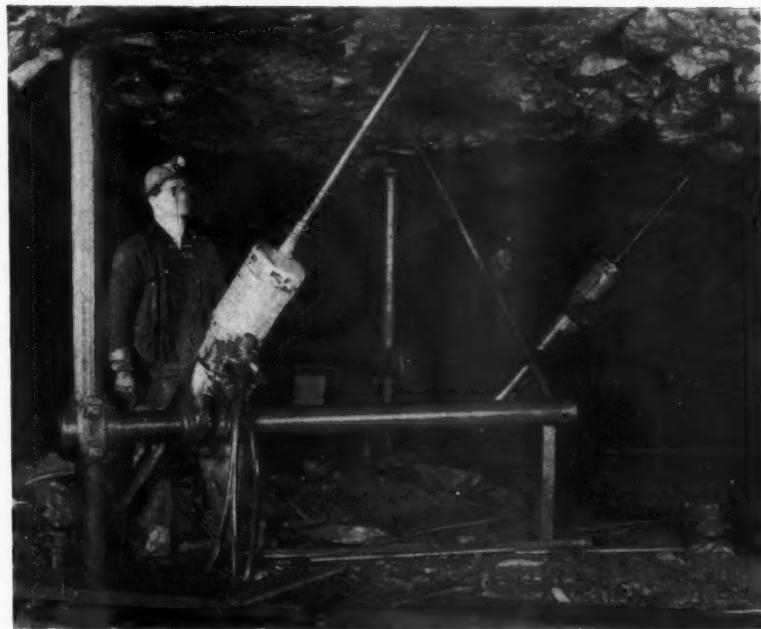
the testing. The average footages drilled per hour by the three machines during this test were: core drill—4.3 ft; drifter—5.1 ft, and stoper—6.7 fph. Tungsten carbide bits from three well known manufacturers were also tested. Assuming the bit cost per foot of hole with diamond impregnated core bits as being 100 percent, the costs per foot of hole with the tungsten carbide bits were as follows: "A" company—62 percent; "B" company—59 percent; and "C" company tests still continuing at about 50 percent.

Evidence gained in all this testing appears to point to the following conclusions when drilling such hard material as the Soudan ore.

Machines with fast light blows and strong rotation, preferably with a cushioning effect as provided by a column-mounted reverse feed stoper give best results. Up-stroke or down-stroke rotation appears to make little difference, except in hand-held raise stopers where down-stroke proved dangerous. It caused the bit to stick, and the machine to spin out of the driller's hands.

Rods of one-in. quarter octagon hollow steel with heavy threads such as Ingersoll-Rand 115 or Timken M type threads are desirable. These threads must be very carefully made with close tolerances to form a tight fit. Loose threads appear to be the only cause of any thread failures that were encountered.

Bits of sufficient size to have large enough tungsten carbide inserts to stand the hard usage are recom-



Electric diamond drilling produced 24 ft of hole per machine shift

mended. Bits 1 1/4 in. diam are used as smaller bits did not stand up. Also, to obtain best fragmentation, the holes are heavily charged with a 40 percent, heavy density, slow acting dynamite. Bits must be sharpened frequently. If they are dulled to a 3/32-in. flat surface, there is excessive chipping, cracking and shattering of the inserts. One bit drilled 62 ft of hole in 15 uses. The average is about

21 ft in eight uses per bit. Insert bits are sharpened with a very light intermittent pressure on a water cooled semi-automatic bit grinder using GC60-L11-VR grinding wheels.

The writer wishes to express his appreciation to officials and members of the Oliver Iron Mining Co.'s staff for assistance in preparing this paper and for information contained in records and previous papers.

Pillar Extraction

(Continued from page 39)

levers, with an indicating scale, so that the operator could tell when he reached the proper top and bottom horizons. With this simple device, the operators have been able to maintain an even bottom which seldom penetrates the fire clay and an even top just under the roof shale. The coal produced by the continuous miner is cleaner than that produced with the conventional unit.

Power Demands Moderate

Power demands were not as high as originally anticipated. Peak demands usually ranged in the neighborhood of 600 amp occasionally going as high as 900 amp. High demands are created when coal dust packs under the cutting chains. This has been alleviated to a large extent by cutting slots in the top deck of the ripper bar, allowing the dust to drop through. However, the space between the upper and lower decks of the ripper bar rapidly fills up with dust and, if not frequently cleaned out, will plug up the slots.

At one time three continuous mining units and two conventional units, with attendant haulage and pumping loads were operated comfortably on a 700 kw substation consisting of one 300 kw rectifier and two 200 kw motor-generator sets. The normal demand was about 2000 amp, and no difficulty was experienced in operating with one 200 kw set out of service during short periods for repairs.

High Recovery Economical

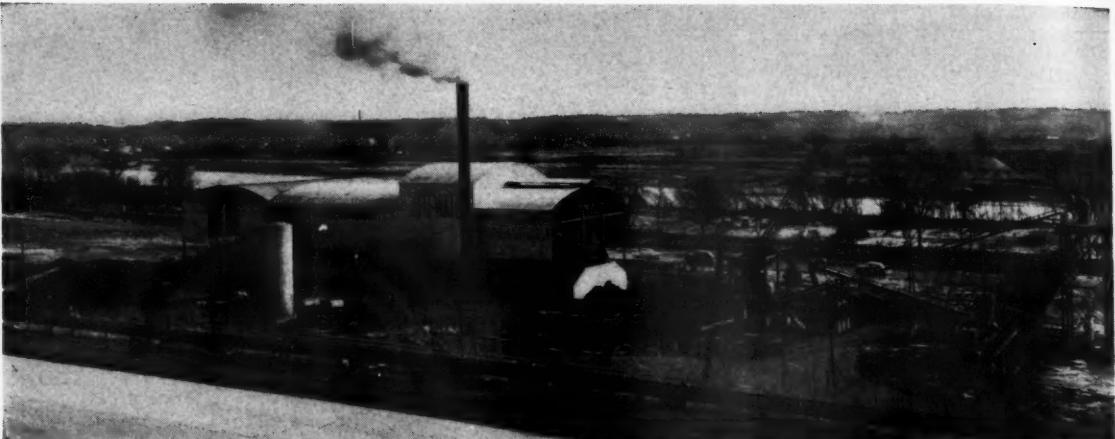
On the basis of the performance of three continuous mining units, two additional units have been ordered. These will make Harwick's production from continuous miners. With 48 percent of the output produced by continuous miners in 1951 the tons per man shift at the mine increased from 6.46 in 1950 to 7.3 in 1951.

Under good roof conditions and in coal reasonably easy to cut the Joy continuous miner is admirably adapted to complete pillar extraction with recoveries in excess of 85 percent. High tonnages per man shift are obtainable in old chain pillars because of concentrated production from few working places and for this reason, at Harwick Mine, considerable

tonnage formerly considered uneconomical to recover with conventional mechanical loading units are now considered economically recoverable.

In order to make the process actually "continuous" some system of roof control which will not interrupt operation must be devised. Further improvement in the design and application of hydraulic hoses, cutting chains and bits offer possibilities of reduced maintenance. Improvements in design to reduce "fly" coal and give a better clean-up would eliminate the necessity of using a loading machine with the miner, thereby reducing operating and maintenance expense.

Indebtedness is heartily acknowledged to J. E. Elkin, general superintendent, Coal Department, Duquesne Light Co., for permission to present this paper, to the supervisors and rank and file employees of Harwick Mine for their enthusiastic acceptance of this new method of mining and in particular, to J. H. Truax, superintendent; G. E. Stacey, master mechanic; Frank Valla, assistant master mechanic and C. D. Shoaf, engineer, all of Harwick Mine for their aid in the collection of data and their assistance in preparing it for presentation.



Clay and coal enter the plant on the left and leave on the right as tough, hard lightweight aggregate

The Mineral Products Company Lightweight Aggregate Plant

THE unprecedented level of industrial and construction activity during the past few years has resulted in an unusual amount of interest in the uses and applications of both natural and manufactured aggregates. An aggregate is basically filler material used in combination with cement to produce concrete. Sand and gravel are the common aggregates in use today and consistently produce a high strength concrete.

Engineers have long been confronted with the fact that steel and concrete requirements increase sharply as the height of a structure increases, simply to support the structure itself. Consequently an excessive, costly amount of both concrete and steel is required over that needed to adequately support the occupants or objects for which the building was designed. The construction industry has also been anxious to obtain a modular concrete building unit which could be more easily handled and which possessed better insulating properties from both a heat and acoustical standpoint.

Can Build Higher

In response to these requirements a rapidly growing new industry—the manufacture of lightweight aggregates—is currently developing. The construction industry, through the use of natural lightweight aggregates and manufactured aggregates currently being produced by a handful of plants located throughout the country, is now able to produce lightweight concretes with favorable insulative properties

Use of Lightweight Aggregates in Concrete Construction Has Brought About the Development of a Rapidly Growing Industry

By B. J. MOATS, JR.

Secretary
The Mineral Products Co.

and satisfactory strength ratios. A twenty-story skyscraper can now be built four stories higher with the same total volume of concrete and reinforcing steel if a lightweight rather than sand and gravel aggregate is used.

While sources of natural lightweight aggregates exist they are generally located in the western states, far removed from the heavily industrialized eastern area of the country. Because of this industrial processes have been developed to manufacture lightweight aggregates closer to the places where they will be used.

The lightweight aggregate industry has made a new application of a basic ore refining process—sintering—which has been used in the metallurgical industry for over fifty years. This process produces an agglomeration of fine particles by heating the mass of the materials used to a point just short of fusion temperature. It is relatively flexible and may be applied to a wide variety of raw materials found in many geographical locations. There are approximately ten plants in the United States today, which employ the sintering process in the

manufacture of lightweight aggregates. There are many more in the planning stage.

In order to gain some insight into the operation of these plants, it will be of interest to take a brief tour through the Mineral Products Co. operation located in Kansas City, Kans. This plant was developed after nearly five years of intensive research work. It is capable of producing 600 cu yd of structural lightweight aggregate daily. Through careful engineering design and extensive use of modern instrumentation, operating labor has been cut to a minimum.

Raw Materials Common

The raw materials used in the manufacture of lightweight aggregate—coal and clay—are common, not only in the Kansas City area, but also throughout a substantial portion of the United States. The Mineral Products Co. was fortunate in locating a wind blown loess deposit with ideal firing properties, similar to those required in the clay brick industry.

The sintering plant consists of two separate sections. One contains the equipment necessary for the proper

preparation and blending of the coal and clay. The second contains the sintering machines and is the section of the plant where clay particles are agglomerated into the tough, hard material which is later crushed and sized to specifications required for use as a concrete aggregate.

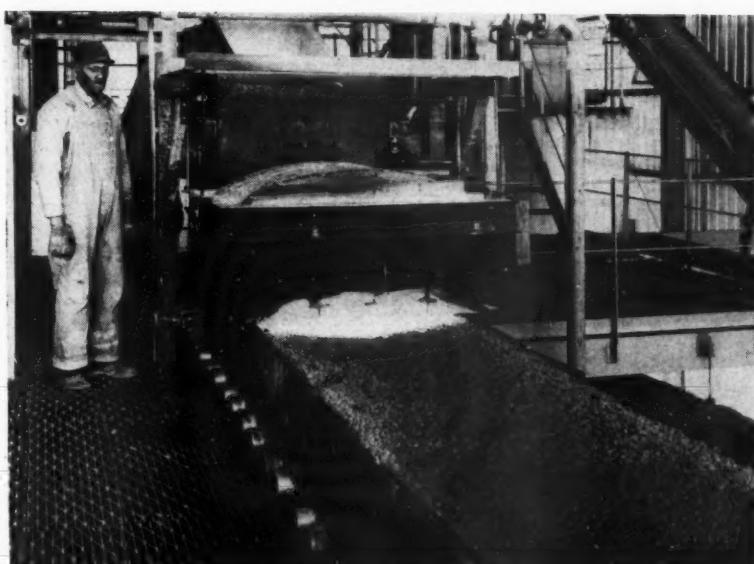
The coal and clay preparation section includes crushers, screens, and pelletizers for producing the required sizes and quantities of a clay-coal mixture for use in sintering. The problem here is to produce the desired sizes of clay and coal particles and to blend them together into one common mixture. The coal is put through a double roll crusher. The coal and clay are volumetrically proportioned on variable speed conveyor belts and discharged into a pelletizer which further mixes these raw materials for delivery to the sintering machines.

Coal Burned Off

The sintering section consists of two Dwight-Lloyd type sintering machines, 42 in. wide and 33 ft long. Large grated pallets which travel in a continuous chain carry the sinter charge and provide an air seal for the three 50 hp blowers which induce an air blast downward through the coal-clay mixture. Ignition of the sinter charge is accomplished by means of fuel oil firing hoods. The clay, in traveling over the sintering machine, is transformed from a loose mixture into a continuous red porous slab. A temperature of 2400° F is developed. The coal is completely burned in the process and there are no remaining by-products of the coal in the slab. The clay is transformed physically from fine divided soft particles into strong, large sections of vitrified clay. These sections are much like irregularly shaped fire brick material with millions of small air cells permeating the entire mass. These large sections are subsequently delivered to the crushing and grading plant where they are broken down into smaller sizes, screened, and recombined in the proper proportions for use as concrete aggregate.



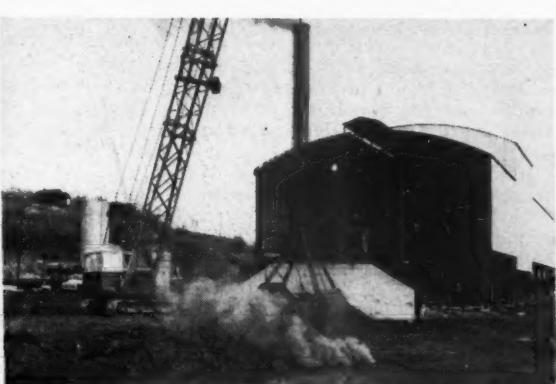
Clay, left, and coal, right, join to make pelletizer feed



This is the ignition hood and part of the sintering machine



Sintering machines vitrify the clay, which is then moved to a storage area for cooling





Growth of mechanization highlighted the need for higher ac voltages at the face

Use of Higher AC Voltages For Face Equipment

A Report of the Committee on Underground Power Explaining the Advantages of AC for Mining Service Through Lower Cost, Higher Efficiency and Greater Safety

By M. K. CLAY and L. W. SCOTT
Subcommittee on AC Power Underground

THE purpose of this report is to show the need for higher ac voltages for face equipment in coal mines, and to go into the advantages and disadvantages of ac vs. dc operation.

The earliest applications of the electric power to coal mining were for haulage by means of electric locomotives. For this purpose trolley wires were installed. The necessary requirement of variable speed for the locomotive resulted in the use of direct current because of its superior characteristics for variable speed and high tractive effort.

Growing mechanization of coal mines, particularly the introduction of mechanical loaders, conveyors and continuous mining machines, with increasingly large electrical loads has produced a distinct trend toward the use of alternating current because of the elimination of conversion losses and the lower cost and maintenance of ac motors.

However, this trend faces the danger of being limited by regula-

tions based on experience with direct current, particularly as to voltage. To assure that the necessary amendments to existing regulations are based on sound thinking, and to allow the most economical use of this medium, without compromising safety, an analysis of the various safety and economic features to be considered is in order.

State Laws Vary

An analysis of the State laws of eighteen states shows results as follows:

- (a) Eight states make no statement regarding voltage.
- (b) Six states limit voltage on trolley wires or on portable equipment to from 240 to 300 v.
- (c) Four states allow voltages higher than 300 v., for either portable equipment or trolley wires.

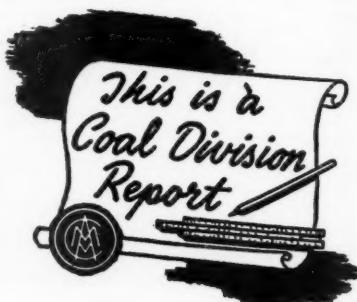
Thus it is apparent that there is a wide divergence among the various

coal mining states regarding permissible voltages.

Shock Hazard Analyzed

The effect of electricity on the human body is governed by many factors. These vary with the condition of the body, type of circuit, voltage and frequency. Of necessity, very little experimental data is available. In general, the extent of injury caused by electric shock depends on the amount of current flowing through the body. This in turn is proportional to the voltage of the circuit and inversely proportional to the sum of the resistances of the body and of its contacts with the circuit.

While data is available to show that the contact resistance of the body has the greatest variation between 50 and 500 v., there is none available to



show the values of resistance at any intermediate points between these voltages. Contact resistance goes down very rapidly when the skin is wet and variations in moisture conditions affect contact resistance much more than voltage does.

There is not enough data available to set any numerical value on the relative hazard of shocks produced by different voltages.

Need Higher AC Face Voltages

With direct current, the accepted standard is to permit a voltage drop of 20 percent at full load, although in many mines the drop is much greater at peak loads. The result of these low voltages with direct current is to slow down the driven equipment. Unless the voltage drops to extremely low values, the current and the torque remain the same, since in a dc motor torque is directly proportional to current.

On the other hand with alternating current the torque is proportional to the square of the voltage. A comparatively small voltage drop produces a very large reduction in torque. If the motor is heavily loaded, it is necessary to limit the voltage drop to 10 percent or the motor will pull out of step and stall.

In other words, dc motors will continue to operate at reduced speed with quite large voltage drops while ac motors will stall and no production can be attained. For this reason, much less voltage drop may be tolerated with alternating current.

With the same load and the same size of conductor, power can be transmitted four times as far at 440 v. as it can at 220 v., with the same voltage drop and the same losses. If the same amount of power is transmitted over the same distance and with the same size conductor, the voltage drop will be reduced to one half and the losses to one fourth. The economics are obvious.

In many cases it will be found economically impossible to transmit power at 220 v. In cases where state laws prohibit the use of 440 v., it becomes necessary to resort to double transformation from high voltage to 440 and then from 440 to 220. This means added expense for transformers, which must be moved quite frequently, plus additional voltage drop and loss in the second bank of transformers.

For example, in order to transmit 150 kva a distance of 1000 ft at a P. F. of 80 percent using 440 v., one 4/0 cable per phase will be required if the voltage drop is not to exceed 10 percent. To transmit this same power the same distance at 80 percent P. F. at 220 v. would require one 1000 MCM cable per phase if the voltage drop is not to exceed 10



With ac power equipment maintenance costs are reduced



Small unit substations transform ac power from high transmission voltages to medium for face use



Conversion underground from ac to dc means complicated, costly equipment and unavoidable power losses

percent. This represents a saving of 7349 lb of copper for the three wires. In other words, 3000 ft of 1000 MCM would cost \$5490 while 3000 ft of 4/0 would cost \$1275—a net saving of \$4215.

Circuit Safety Greater

It is self-evident that the safest circuit is the one which offers the least possibility of bodily contact, irrespective of voltage in the medium voltage range. On this basis, the most hazardous circuit is the open trolley wire with return rail and the safest would appear to be one with all wires insulated.

The three-phase, grounded Y circuit with a line to line voltage of 440 v. assures a maximum voltage to ground of only 255 v. This is less than the maximum allowed for trolley wires in any state. The chances of a shock from phase to phase are exceedingly remote. Since the frames of all machines are grounded, the only way a man can receive a line to line shock is by opening a switch box and deliberately placing his hands inside.

Save Material and Manpower

The additional amount of copper required by the use of 220 v. over that necessary with 440 v. is a needless waste of a material in extremely short supply and badly needed for defense.

Use of additional transformers to reduce the voltage from 440 to 220 is not only an additional expense and further unnecessary use of critical material but requires the use of manufacturing manpower that could be more usefully employed.

The large additional kwh losses dissipated as heat in the conductors is not only an unnecessary expense but a drain on the power supply of the country which is already severely strained.

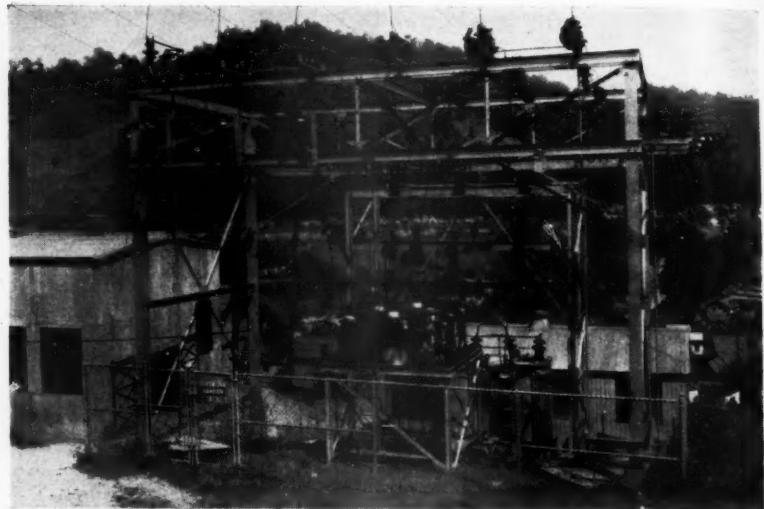
Recommend Legislation

Efforts must be made to secure legislation in each of the coal mining states, which do not now permit the use of 440-v. ac face equipment, to permit by law the use of 440-v. grounded Y circuits for such equipment.

Grounding of the circuit and the frames of all machines to be in accordance with the report on grounding and circuit protection by the committee on Underground Power of the American Mining Congress dated July, 1951; single phase, 110 v. hand held drills to be supplied from separate 440/110 volt transformers, to comply with Federal code.

Testing of all grounds to be required at beginning of each shift.

The request for such legislation to be based on the factors of increased safety over open 275 v. trolley wires,



Transmission characteristics of ac are far superior to those of dc

voltage to ground of only 255; saving in critical material and electric power and economic necessity for higher voltage than 220 on face equipment.

Conclusions

There is a definite trend to more ac operated face equipment.

Economics require the use of higher voltages.

The grounded Y 440-v. system is far less hazardous than the open, 275-v. trolley.

Efforts must be made by mine management or operators' associations to secure legislation to permit the use of 440 v. grounded Y systems for face equipment, provided proper grounding and maintenance of equipment is provided.

Deep Stripping

(Continued from page 64)

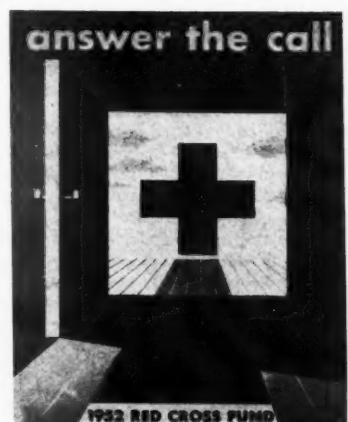
of the four truck stalls have concrete-lined pits for underside repairs and adequate provisions have been made for supplying compressed air, water, and electric current. One end of the building is partitioned off to accommodate a tire repair shop, a small machine shop and a parts storage room. The entire unit is heated by a hot air furnace.

Conclusions

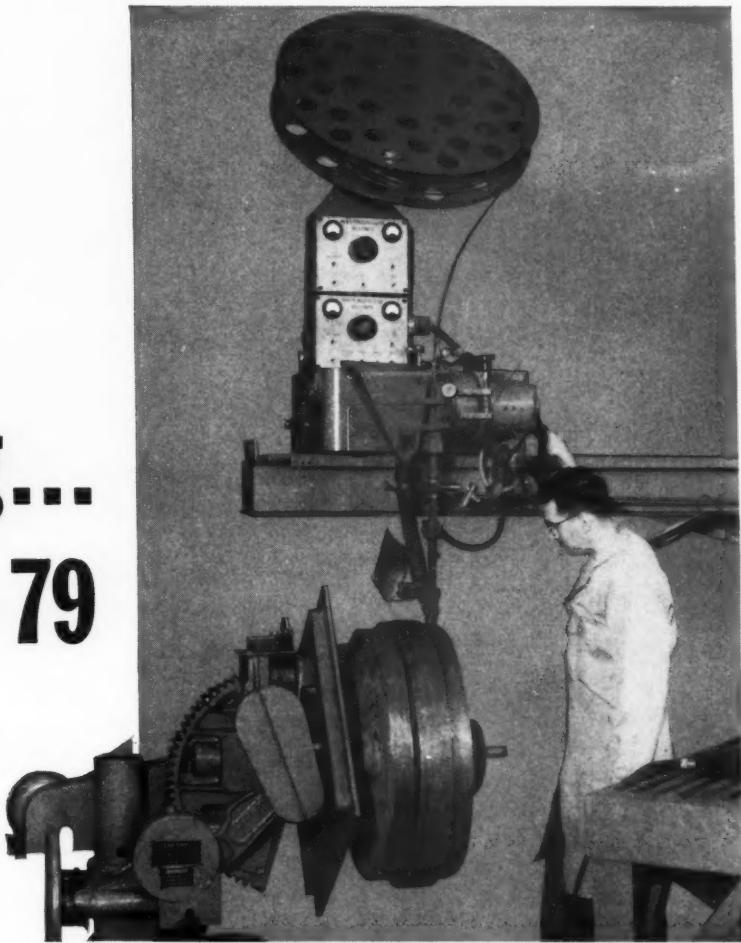
As the supply of coal available from relatively shallow and low-ratio stripping operations becomes depleted, attention must be turned to the deeper and higher ratio pits. The large dragline which made its advent some 20 yr ago, served as a temporary means of successfully operating many of these more extensive pits. At the present time, however, there are but a few of these machines that are not worked in one way or another in conjunction with haul equipment. Many operations are purely and simply "haul jobs." Many more must be planned as such if the industry is to continue to flourish.

Larger and more economically operated hauling and loading equipment is appearing on the scene each year.

Fifty-ton hauling units of two different makes, suitable for hauling heavy rock overburden, are now out of the experimental stage and are finding practical application in the coal field. New 8 and 10-cu yd loading shovels of the two-crawler type, have just recently been made available. New drills, one of the percussion type and one of the auger type, will probably permit substantial savings in drilling costs. Progress such as this lends confidence and assurance to the future success of Deep-Mine Stripping.



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Wheels of GOVERNMENT



As Viewed by A. W. DICKINSON of the American Mining Congress

SETTING its sights on an early July adjournment, the House is speeding the departmental appropriations bills on their way to the Senate. Four of these measures are now in the hands of Senate Appropriations subcommittees. These include Treasury and Post Office, Third Supplemental, Independent Offices, Labor and Federal Security, while the Interior Department bill is expected to pass the House in the near future. Some gratifying reductions have been made below the amounts requested in the White House budget message.

Senator O'Mahoney's (Dem., Wyo.) Congressional Joint Committee on the Economic Report has recommended a \$10 billion cut in the President's \$85.4 billion budget, and Finance Committee Chairman George (Dem., Ga.), calling for material reductions in the military and foreign aid requests, declares that the proposed over-all budget should be reduced by \$7 billion.

The sincere effort of Senators George, Millikin (Rep., Colo.), Dworshak (Rep., Idaho), and McClellan (Dem., Ark.) to reject the White House plan to reorganize the Bureau of Internal Revenue failed by a vote of 53 to 37. Treasury Secretary Snyder is now carrying out the plan, which includes the placing of Collectors of Internal Revenue under Civil Service.

Defense Production Act

The Senate Committee on Banking and Currency, following three weeks of hearings, now has the proposal to extend the Defense Production Act for two years under consideration. It is apparent that the Committee will limit extension of the Act to June 30, 1953, and will include a price decontrol formula for items selling below price ceilings, in the bill which is to be reported March 31.

The House Banking and Currency Committee is now proceeding with its hearings on the extension proposal.

Renegotiation

Chairman Koehler's Contracts Renegotiation Board has issued its revised regulations, based on the tentative announcement made public Janu-

ary 10, but has not made changes in the tentative Raw Materials Exemption List. The National Academy of Sciences now has the Raw Materials List under review for the purpose of recommending to the Board any additions or changes which it believes should be made. Producing companies subject to contract renegotiation have until May 1 to file their Letters of Preliminary Information with the Board. Producers of commodities not contained in the exemption list as published January 10, are required to file Letters of Preliminary Information.

International Materials Conference

Spurred on by the limited allocations of copper and other metals to manufacturers in the Michigan area, Senator Ferguson has charged for several months that the International Materials Conference is responsible for much of the unemployment in industrial centers. He criticizes the IMC as an international cartel and a trust, which exists without statutory authority.

The Michigan Senator has introduced a bill to curb the activities of IMC, asserting that "under the guise of cooperation for defense, an international cartel has been created for the purpose of allocating raw materials among the free nations of the world. This is the International Materials Conference—IMC—created by the State Department last year at the urging of Prime Minister Attlee. . . . This body now fixes the amount of copper, zinc, sulphur, nickel, cobalt and newsprint we may consume, how much of our own production we may sell to ourselves, and how much we must deliver to the other nations according to a master plan." The Senator further asserted: "The bill which I have introduced is designed to make it impossible for this Administration to usurp the powers of the Defense Production Act for unauthorized purposes in the future."

Meanwhile, Representative Martin of Massachusetts, House Minority Leader, has appointed four committees to study (1) legality of the IMC;



Washington Highlights

CONGRESS: Speeding appropriations bills

DEFENSE ACT: Senate to get bill soon

RENEGOTIATION: Board issues regulations

IMC: To be investigated

ST. LAWRENCE: Senate hearings end

COAL MINE INSPECTION: Neely bill on Senate program

MINING LAWS: Regan bill checked



(2) effect of IMC operations on U. S. automobile industry; (3) IMC's effect upon the electrical industry; and (4) weighing IMC's impact on other industries.

St. Lawrence Project

Winding up four days of hearings on February 29, the Senate Committee on Foreign Relations has taken no further action on the bill sponsored by Senator Green (Dem., R. I.) and others, which would authorize U. S. participation with Canada in the construction of the St. Lawrence Seaway and Power Project. The situation in the Committee is controversial as Chairman Connally (Dem., Tex.) is known to be vigorously opposed to the measure.

Coal Mine Inspection

The Neely (Dem., W. Va.) Federal Coal Mine Inspection bill, reported to the Senate February 27 and discussed in last month's issue, was considered during a calendar call of pending bills on March 24 and passed over on request of Senator Schoeppl (Rep., Kans.). The bill has been included in a list of measures which had been placed on the Senate Majority Leader's program for consideration.

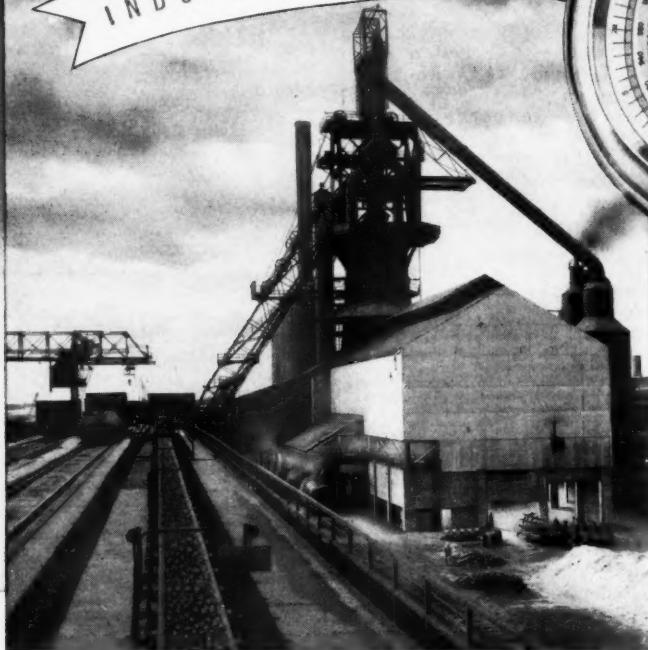
On the House side the Price (Dem., Ill.) bill, a similar measure, is under consideration in Chairman A. B. Kelley's Education and Labor subcommittee. (Continued on page 96)

Steel

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SUPERLA Mine Lubricant has cut lubrication troubles in this mine . . . it can do the same in your mine. There's a Standard Oil lu-

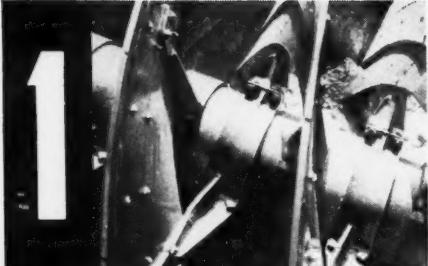
brication specialist located near you who knows mining equipment and how to lubricate it best. He is at your service for on-the-job help on any problem related to lubrication. Why not call on him today? Just contact your nearest Standard Oil office, or write: Standard Oil Company (Indiana),

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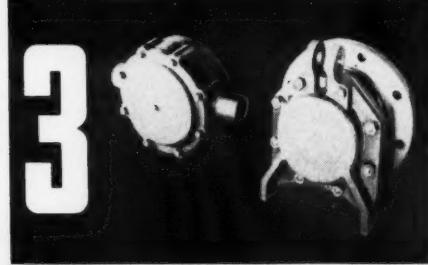
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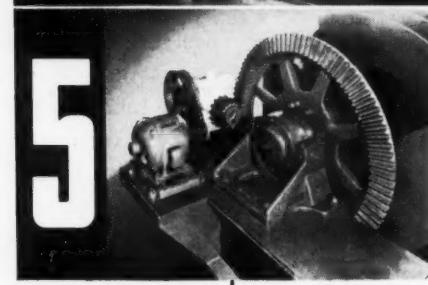
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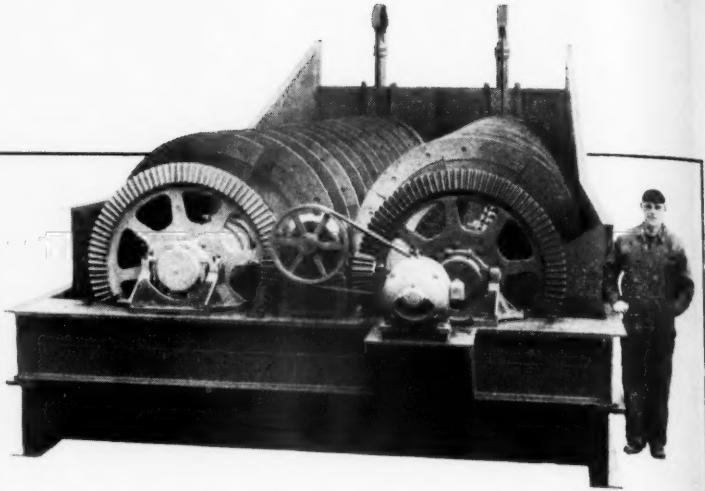
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5



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High degree of flexibility—ability to handle coal at operating gravities from 1.35 to 1.65, with size range as wide as 10" x $\frac{1}{8}$ " to one washing unit.

Dependable performance—steady, uniform, trouble-free operation. Specific gravity of mixture remains constant; efficiency of separation is unaffected by fluctuating loads or changing qualities of coal.

Easy operation—change-over from one washing gravity to another can be made in five minutes, simply by opening or closing valves . . . all under one-man control.

Profit from these and other advantages of the Chance Process. Our engineers will be glad to cooperate with you in solving any of your coal-cleaning problems.



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WITH A BACKGROUND OF OVER SIXTY YEARS' EXPERIENCE

"Summer-ize" For Greater Production

THE good housekeeper looks forward to spring as a time to put her house in order, taking inventory of the condition of everything, do a thorough cleaning job, and be in tip-top shape to enjoy the new life after a long winter. So, too, with owners of machinery. Spring is the time to inventory the condition of each piece of equipment whether it has been in mothballs or working through the winter. Now is the time to bring every machine to the peak of efficiency to get the greatest return in productive hours for the investment.

This is also the time to review the preventive maintenance schedule with mechanics and operators, make any necessary changes, and prepare to follow it so that machines will continue to be on the job day after day.

Operator Important

Since the operator is the most important controlling factor in any preventive maintenance program, he should be given an active part in the spring check-up if possible. He must understand the equipment he operates so that he knows when it does not function properly. He should immediately notify his foreman or master mechanic so the proper repairs can be made. When an operator likes his machine; knows what it will do and what are its limitations, he can get out of it everything the manufacturer designed and built into it.

Clean the Equipment

A thorough wash job followed by a steam bath is a must, not only to turn up rust spots that should be taken care of but to reveal any exterior cracks and breaks. Cutting edges of dozer blades, for example, should be examined and replaced if necessary.

A good set of wrenches is needed for tightening all nuts, bolts and cap-screws. Those with worn threads, and heads that are turned should be discarded and replaced.

Tracks

Be sure that track shoes on crawler tractors are bolted securely. Track pins and bushings should be checked for wear, to determine whether they

are in serviceable condition or need to be turned or replaced. Check the track release mechanism and make necessary adjustments. Final drive sprocket teeth should be inspected for wear.

Where there is too much or too little slack, tracks are liable to breakage, unnecessary wear and damage. Each manufacturer makes its own recommendations as to slack. When the track can be pried above the top roller or rollers so there is a clearance of 1½ to 2 in. between the two, it is generally regarded as having the right slack. One manufacturer recommends a three-in clearance between the top roller and track on the largest model.

Tires

Tires on wheel tractors and graders need a thorough inspection for cuts and bruises. If a cut has penetrated into the body, repairs should be made immediately. Each manufacturer's recommendations on inflation pressures should be followed implicitly.

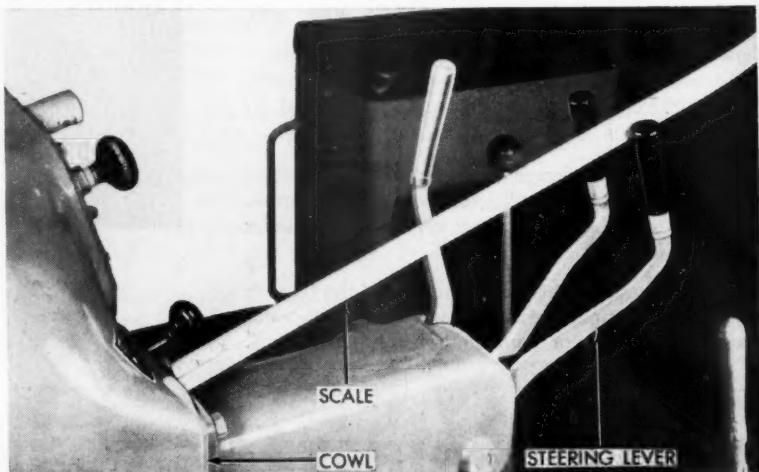
During tire or tube change, re-examine the interior of the casing to be sure all dirt and water have been removed. Check the flap for correct

size for the tire and rim. If removal instructions have been followed, the size will be marked on the flap. Use a brush or cloth swab to apply a solution to the base of the beads or the rim. Do not allow any soap solution to get in here or dangerous slippage may result. Vegetable oil soap is obtainable from your tractor dealer. If the tube and flap are not properly lubricated, they will be stretched thin when inflated. Inflate to seat the tire beads on the bead seat of the rim. Then deflate completely. Inflate to the final recommended pressure.

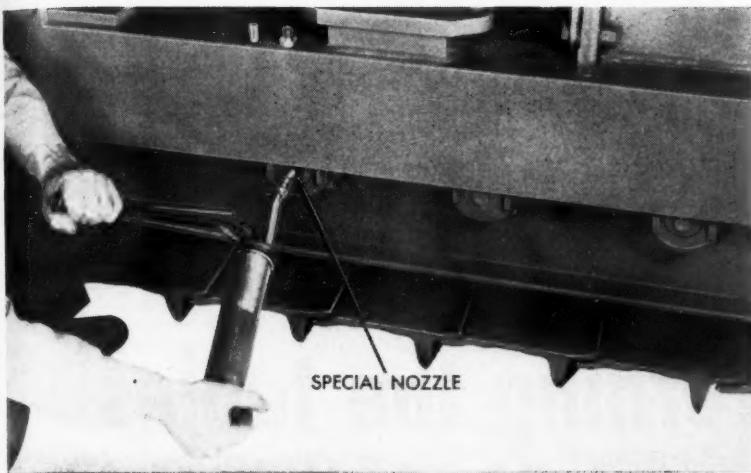
Clutches and Brakes

Action of the engine clutch, and steering clutches and brakes needs careful attention. If there should be any slippage, make adjustments according to the manufacturer's instruction. Should slippage still occur when adjustments are made, linings need to be checked for wear, and replaced, if necessary.

Clutch and brake linings on power control units should be inspected, adjusted if necessary, or replaced if there is not sufficient adjustment left.



Adjust steering clutch levers



Lubricate truck rollers

Thread new cable if the old is worn very badly or kinked. Your own experience and operating conditions determine whether to lubricate the cable for longest life.

Electrical System

The electrical system—battery, wires, starting motor, generator, and lights—should be carefully inspected.

Check level of the water in the battery weekly or as often as operating conditions dictate. In extremely hot weather, frequent checking is essential because the water evaporates quickly. Clean the top of the battery and the terminals with a strong solution of soda, and then coat the terminals with vaseline to prevent corrosion. Filler caps must be kept tight.

Be sure the starting motor and generator are functioning and that the battery is being kept charged. Make adjustment of the brushes as recommended by the manufacturer. Trace all wires, looking for breaks and loose connections. It is better to replace a wire than just joining the ends and wrapping them with friction tape. If bulbs in the lights are burned out or dim, replace them.

Engine

The engine is the heart of the tractor. Each manufacturer has specific recommendations for engine tune-up, whether carburetor or diesel. These are the most satisfactory to follow for maximum engine performance. Check for wear of valves, rings, pistons, and bearings. Diesel engine injection systems need the care of an expert, should there be any indication they are not functioning correctly.

Cooling System

Maintenance of the cooling system consists mainly of making sure nothing interferes with proper flow of cooling fluid and air.

within the block and cylinder head warms up while the water in the radiator remains cold. If the water in the radiator warms up as quickly as that in the cylinder head, the thermostat is stuck open. If the water in the engine becomes extremely hot and the water in the radiator stays cold, then the thermostat is stuck closed.

Lubrication

Follow the manufacturer's lubrication charts for engine crankcase, transmission, and final drives. Use recommended grades for warm weather operation. Grease all pressure fittings, and for efficient preventive maintenance, follow the schedule as outlined by the manufacturer.

Air Cleaners

Care of air cleaners is important to assure long engine life. All connections between the air cleaner and engine must be kept tight and dust-proof. Service pre-cleaners and oil bath air cleaners as recommended. Operating conditions will determine how frequently.

Hydraulic System

Finally, the hydraulic system should be inspected for leaks and faulty operation. Replace hoses and pipes that are damaged. On open systems, check and clean the breathers. Drain and flush the system. Refill with the oil recommended. Disassemble and inspect the pump if there is any doubt about its efficient operation.

Lubrication on schedule, periodic inspections, and operators trained to detect trouble immediately form a combination that keeps equipment on the job the greatest number of hours and permits taking advantage of the life built into machines at the factories.



Check the track release adjustments

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THE THINGS A
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Enables you to actually
demonstrate your products

Brings your prospects
to you

Introduces new products
quickly

Produces inquiries
and leads

Opens new markets for you

Establishes contact
with people your
salesmen can't reach

Builds sales organization
confidence

Establishes your firm

Enables you to broaden
your sales organization

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suppliers to the mining industry

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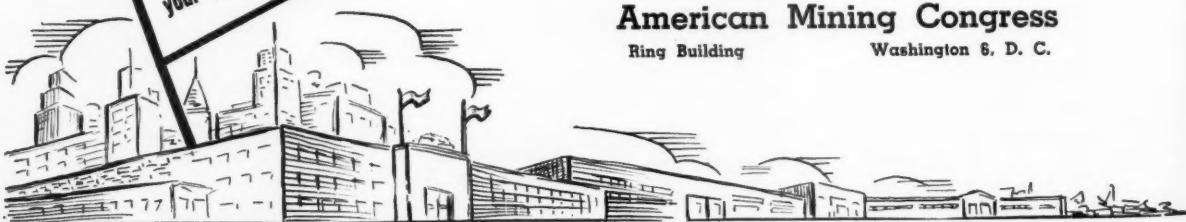
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Personals

William J. Coulter, vice-president of Western Operations for Climax Molybdenum Co. announced the promotion of **C. J. Abrams** to General Manager of Operations with headquarters in Denver.

Abrams went to Climax in 1928 and has been continuously in the employ of the Climax Molybdenum Co. with the exception of a three-year period from 1936 to 1939 when he was associated with the Colorado Iron Works. Since 1939 he has been general superintendent of the operations at Climax, Colo.

Franklin Coolbaugh who has been assistant general superintendent of the Climax operation is being promoted to resident manager of operations at Climax. He joined the company in 1932 and with the exception of a three years' period spent in the armed forces as Captain in the Engineers Corps, has been in continuous service.

Russell D. Squibb is now industrial engineer with the West Virginia Coal and Coke Corp. Before coming with West Virginia Coal and Coke, Squibb was general manager of Truax-Traer's eastern division. Before that he was with the Youghiogheny and Ohio Coal Co.

George C. Earl, chief engineer, Utah Copper Division, Kennecott Copper Corp., has retired. He will be succeeded by **L. C. Jones**, who has been assistant chief engineer. Earl will continue to serve the division as a consulting engineer.

Adolph Soderberg, formerly engineer of mines, will succeed Jones as assistant chief engineer.

John Willard Buch, chief, Anthracite Subregion, U. S. Bureau of Mines at Schuylkill Haven, Pa., received a Department of the Army award March 7, for his contribution to the World War II effort in industrial intelligence.

Buch, of Schuylkill Haven, served



C. J. Abrams

with the Technical Industrial Intelligence Committee, which worked closely with the Joint Chiefs of Staff during the last war.

The American Smelting and Refining Co. recently announced that **R. D. Bradford**, general manager of western smelting and refining operations, was transferred to the New York offices of the firm. He was succeeded by **E. McL. Tittmann**.

Lester G. Morrel has been appointed Chief of the North American Division of Region IX (Foreign Minerals) of the Bureau of Mines with headquarters in Washington, D. C. Morrel has been with the Bureau's North American Division since 1950. He is an authority on gold, silver, lead and zinc ores.

Earl C. Kirk has been named by-product engineer of Pittston Coal. Kirk will assist in the servicing of by-product coals that are produced by the Clinchfield Coal Corp. and The Raleigh Smokeless Fuel Co.'s group of mines.

Prof. Clifton W. Livingston, head of the mining department at the Colorado School of Mines, is leaving that post on May 31 to become president and director of research for the Mining Research Corp.

Robert A. Richie, president, Hutchison Coal Co., has announced the appointment of **T. M. Wyatt** as vice-president of Hutchison Coal. Before taking his new job Wyatt was president of the Birch Mining Co. and vice-president of the Basic Coal Co.

George C. Floyd, vice-president of Vanadium Corporation of America, has been elected a director of the company. Prior to his association with Vanadium Corp. on January 1, 1952, he had been a vice-president of Thomas Steel Co.

Patrick J. Gibbons has retired as executive vice-president and director of the company. Associated with Vanadium for thirty-two years, he has been retained in an advisory capacity as consultant to the president.

Frank Nugent, executive vice-president, Freeman Coal Mining Corp., recently announced the appointment of

D. E. Johnson as combustion service engineer. Johnson has been associated with the Central Indiana Coal Co.

Helmar A. Johnson, Anaconda, Mont., has been named resident manager, Galigher Co., Salt Lake City, Utah at its Monticello, Utah uranium mill, which it operates for the Atomic Energy Commission. He was formerly surface superintendent for the Vermont Copper Co., Inc., So. Stratford, Vt.

Lawrence B. Berger has recently been appointed Chief of the Health Branch of the Bureau of Mines Health and Safety Division. Berger has been acting in this position since the former chief, Dr. H. H. Schrenk, transferred to the Public Health Service in November 1948.

Frederick W. Dent, Jr. has been named superintendent of Gogebic range operations of the U. S. Steel's Oliver Mining Division. Dent succeeds **Harry W. Byrne**, who retired after 43 years of service with the company.

H. A. Reid, vice-president in charge of operations for The United Electric Coal Companies, recently announced that **John J. Huey** has been promoted from chief electrical engineer to director of research and machinery development, with headquarters in the Chicago offices of the organization.



Huey graduated from the University of Minnesota in 1932 as electrical engineer. From 1933 to 1941 he was with the Westinghouse Electric Corp. He has been with The United Electric Coal Companies since 1941.

Brigadier General William W. Wanamaker, U. S. Army, retired, has been appointed chief engineer of the Orinoco Mining Co., it was recently announced by Mack C. Lake, company president. General Wanamaker will divide his time between the iron ore concessions of Orinoco Mining Co. in Eastern Venezuela and the New York offices of the company.

Oliver Bowles, retired from the U. S. Bureau of Mines in 1947 after 33 years of service, has been re-appointed as a consultant to assist in various problems of mineral supply which have become urgent during the present emergency.

E. W. Claar has been appointed manager of Eastern Clay Products Department of International Minerals

& Chemical Corp., according to an announcement by Norman J. Dunbeck, IMC vice-president in charge of the Industrial Minerals Division. Claar was formerly central district manager of Eastern Clay Products, Inc., which was recently acquired by International Minerals & Chemical Corp.

Dr. Richard M. Foose, Head of the Department of Geology at Franklin and Marshall College, has been named the delegate of the A. I. M. E. to the 19th International Geologic Congress in Algiers this coming summer.

Donald D. Smith has been elected to succeed J. D. Swift as president of Central Eureka Mining Co. Swift announced his retirement at a recent meeting of the board of directors.

Richard W. Smith was recently named manager of the Natural Resources Department of the Chamber of Commerce of the United States. He succeeds **David J. Guy**.

At a recent meeting of the Board of Directors of The Cleveland-Cliffs Iron Co., **James D. Ireland** was elected a director of the company. He succeeds **George B. Young**, who has been a director of Cleveland-Cliffs since 1947.

W. J. O'Connor has been named president and general manager of the Independent Coal and Coke Co., Salt Lake City, succeeding **Trevor O. Hammon**, who retired. **Walter F. Clarke** is assistant general manager. O'Connor was formerly general manager, American Smelting and Refining Co., Utah Department.

Charles R. Kuzell has been appointed general manager of Phelps Dodge Corp., with headquarters at Douglas, Ariz. He entered the employment of United Verde Copper Co. in 1918 and was general superintendent there when the company was acquired by Phelps Dodge. He has served the corporation at various properties ever since. **Walter C. Lawson** was named to succeed Kuzell as assistant general manager. Lawson joined Phelps Dodge in 1926 at the New Cornelia branch. He served there, at Morenci, being transferred to the general offices in Douglas in 1951.

Monroe J. Mechling was recently appointed safety director for all mines of the Valley Camp Coal Co. His experience in safety work goes back to 1919 when he joined the Clarkson Coal Mining Co., as mining engineer, advancing to general superintendent of mines for the company. He then became safety director for the North American Coal Corp. In 1941 he was appointed senior coal mine inspector, U. S. Bureau of Mines, and was made chief of the Fairmont, W. Va., office of the bureau. He continued in that capacity until accepting his present position.

—Obituaries—

Harrison M. Lavender, 61, vice-president and general manager, Phelps Dodge Corp., Douglas, Ariz., passed away on Friday, March 21. Born in Scotland, S. D. in 1890, his long career as a mining engineer in Arizona, Colorado, Utah and Mexico

started in 1916 but was interrupted by two years' service with the Army Engineers 1917-1919. He was chief engineer of Calumet & Arizona Mining Co. at the time of its merger with Phelps Dodge

in 1931 and became mine superintendent at the latter's Copper Queen branch after the merger. He became general manager of Phelps Dodge's Mining Division in 1937, and vice-president of the corporation in 1946. In 1949 he was made a director of the corporation. The Colorado School of Mines, his Alma Mater, awarded him its medal for distinguished achievement in 1948. The Lavender Pit, newest Phelps Dodge surface mining operation in Arizona, was named in his honor last year. He took an active part in the work of industry organizations such as the American Mining Congress and American Institute of Mining and Metallurgical Engineers.

His many friends and associates—in business and social life—find it hard to realize that "Harry" Lavender, with his zest for living, his uncommon common sense and cool judgment will no longer be there to lend a hand when the going is rough.

Frank F. Colcord, 74, director and former vice-president, United States Smelting Refining and Mining Co., died suddenly on March 21 at San Marino, Calif. He joined the company in 1910 and was head of the Sales Department when he retired in 1947. He continued as director until his death.

William Wilson, superintendent of the Westland Division of Pittsburgh Coal Co. passed away on February 21, after a short illness. Mr. Wilson was employed in various official capacities at Westland mine for approximately 25 years. He started there as a pumper and worked as assistant foreman, mine foreman and superintendent until he was made a division superintendent last year.

Leo Rogge, long prominent in Alaskan mining, and also as a legislator, died recently in Seattle, Wash., at the age of 73. He had been the super-

intendent of disbursements for the U. S. Mining Smelting & Milling Co., Fairbanks, Alaska, for 26 years, retiring only a few years ago to live in Seattle. Born in Davenport, Iowa, he went to Alaska at the height of the gold rush at the beginning of the century. Later he served four terms in the House of Representatives and two in the Senate.

H. Alanson McAllister, executive director of the Logan Coal Operators Association died February 29 in Logan, W. Va. Mr. McAllister, 63, was also president of the Clean Eagle Co. and a director of the Southern Coal Producers Association. A native of Columbus, Ohio, he went to Logan in 1935 to become associated with the Lorado mining interests, following a period as a professor at the University of North Dakota.

Marion Dwight Harbaugh, 59, president of the Lake Superior Iron Ore Association, died of a heart attack March 19 at his home in Hudson, Ohio.

Mr. Harbaugh was born in 1892 in Kansas City, Mo. Following graduation

from high school he was for several years a surveyor for the Missouri Highway Department. Deciding to finish his education he enrolled in the University of Wisconsin, where he received his B. S. degree in Mining Engineering in 1923 and his M. S. degree in Geology in 1925. He served as instructor in geology in the University of Wisconsin for four years and then entered private consulting engineering and geological practice.

In 1929 Mr. Harbaugh became secretary of the Tri-State Zinc and Lead Ore Producers Association at Picher, Okla., with residence at Miami, Okla. He continued in this position until the fall of 1936 when, at the instigation of R. C. Allen, he moved to Cleveland to become vice-president and secretary of the Lake Superior Iron Ore Association. He was made president of this Association in November, 1951.

The Harbaughs maintained their home in Hudson, Ohio, where he was active in local civic, educational and religious affairs. Space will not permit a cataloging of his many valuable services to science and the mineral industry on a national scale.

Mining will not soon find another man who possesses the fine traits of character, the energy and the intelligence of "Doc" Harbaugh. His untimely passing is a severe blow.





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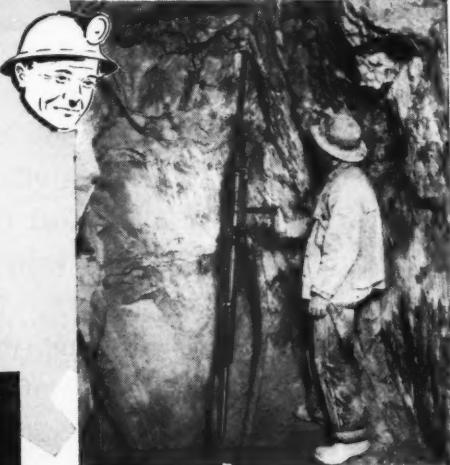
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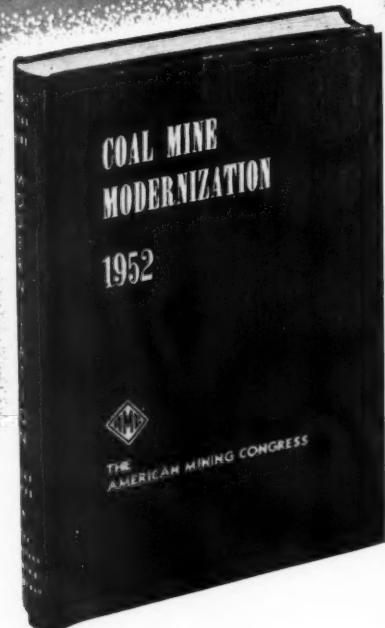
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NEWS and VIEWS



Eastern States

Big Unwatering Problem

The Glen Alden Coal Co., Scranton, Pa., pumps some 33 billion gallons of water annually. This pumping load, approximately 24 tons of water for each ton of coal mined, cost Glen Alden nearly \$1,800,000 in 1951.

In an effort to develop a reasonable long term solution to this problem, the company is cooperating with the U. S. Bureau of Mines in an industry-wide study of the drainage problem in the Pennsylvania anthracite fields.

To Construct 300-Ton Mill

Bids are being called for by Penn-Cobalt Silver Mines for construction of a new 300-ton mill on their zinc-silver-cobalt property. This is expected to be the Cobalt, Ont., camp's largest capacity milling unit operating on primary ores, and has been designed to facilitate expansion to 500 tons daily as ore developments may warrant. Production is expected to commence late this year, equipment deliveries permitting.

Select Floor Stone

A stone from Armco Steel Corp.'s limestone quarry at Piqua, Ohio, has been selected to represent Ohio in the rostrum floor of the Flag House being constructed by the Department of Recreation and Parks in Baltimore, Md.

The mosaic map will be made up of

one piece of stone from each state in the Union. The pieces will be cut to the individual state outline, and when properly placed will make up a map of the Nation.

Maryland officials invited each state to select its own stone for the project, and Ohio's Division of Geological Survey chose the Armco quarry to supply Ohio's only stone in the symbolic installation.

Uranium Ore in New Jersey

Dr. Arthur P. Butler, Jr., a geologist of the U. S. Geological Survey, has said that primary uranium minerals have been found in New Jersey. Butler, chief of the analysis and reports unit of the Survey's office of trace elements, reported that primary uranium minerals occur in pyrometamorphic deposits in the Franklin limestone in Warren County, N. J. The deposits are of interest principally because they indicate the presence of primary uranium deposits in the Appalachian area.

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New Cement Plant Operating

The new plant of the Marquette Cement Manufacturing Co., located at Brandon, Miss., has been put into operation. This marks the first time that cement has been produced for the southern market in that state.

To Develop Peru Iron Ore

A contract has been signed between the Utah Construction Co. of San Francisco and the Peruvian Government Corp. for the development of a large iron ore body in the South American country. The San Francisco company expects shipments of from 100,000 to 200,000 tons of ore a month from the open-pit mine. It could easily go higher than that it is said.

The contract with the Peruvian Government Corp. gives Utah Construction six to eight months to conduct further tests of the deposit and a 20-year concession to mine the ore. The Peruvian corporation will collect a royalty on all ore. Most of the ore is expected to be shipped to blast furnaces in the eastern United States.

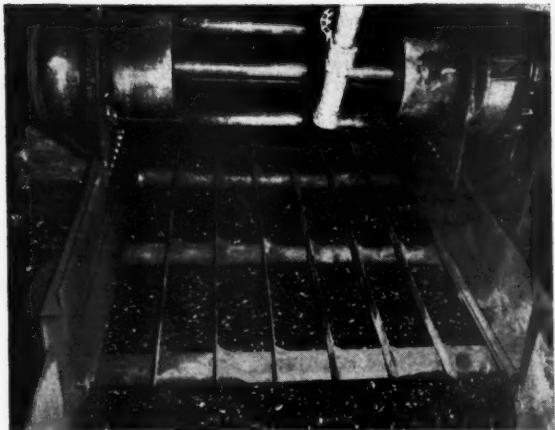
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Railway Taps Nickel Area

Expenditures of the Canadian National Railways are expected to reach \$7,800,000 this year on its project for construction of a rail line between Sherridon, Man., and Lynn Lake, Man., the Transport Department has advised the Canadian House of Commons. The 155-mile line, to open up a new base-metal mining area, is to cost \$14,725,000 in all. The report did not indicate how much track would be laid down this year.

Add to Ore Fleet

The launching of the steamer *Cason J. Callaway* brings the number of ships launched this winter by the U. S. Steel Co.'s Pittsburgh Steamship Division to three. All three carriers, the *Arthur M. Anderson*, launched February 16, the *Philip R. Clarke*, launched November 26, and the *Callaway*, launched March 22, each are 647 ft long and have a designed cargo capacity of 19,720 gross tons at maximum summer draft of 25 ft- $\frac{3}{4}$ in. The completed vessels will swell the total annual capacity of the fleet by 2,200,000 tons. They will have a speed of 16 $\frac{1}{4}$ mph, which will allow them to make a round trip in a little over five days.

The three new ships are named for directors of U. S. Steel.

Close Famous Coal Mine

The old Thealka mine, Thealka, Ky., of the North-East Coal Co., a pioneer of the Big Sandy Valley, suspended operations for good early in February. The mine was started in 1905 by the Keyser Coal Co. and taken over a few years later by North-East.

Iron Ore Search in New Jersey

A Preliminary Total Intensity Aeromagnetic Map of Part of the Somerville Quadrangle, New Jersey, covering an area in which there is a possibility of discovering new iron ore deposits, has been released on open file, according to Secretary of the Interior, Oscar L. Chapman.

This map presents the results of an airborne magnetometer survey in northern New Jersey by the Geological Survey. On the map, anomalies in the magnetic field caused by subsurface rock strata are shown by contours. The map thus provides the geologist and prospector valuable data for use in locating new magnetite (iron-ore) deposits or in extending known deposits beyond proved areas.

Issuance of rough work-sheet copies of the map at this time is in response to requests for advance information on results of the survey. Final maps on the area, presenting both aeromag-

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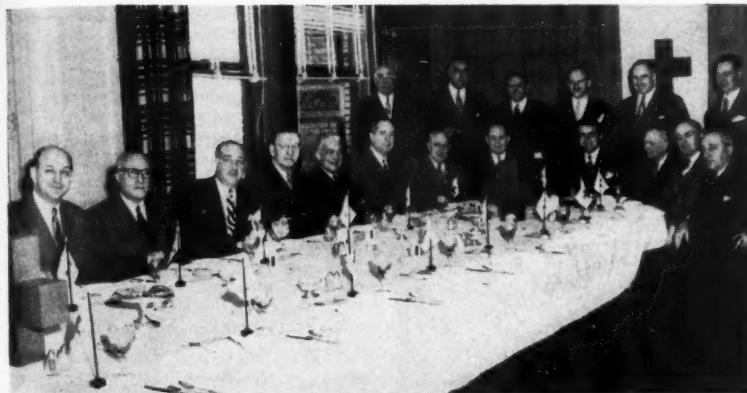
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JOURNAL



Peter H. Tuttle, president of Tuttle-Dovey Coal Mining Co., entertained a group of leaders of New York's coal industry at a luncheon recently in the Whitehall Club to plan Red Cross activities for their field during Red Cross Month. Seated, left to right are: S. A. Elmore, district manager, Red Jacket Coal Sales Co.; Myron B. Weil, president, Myron B. Weil, Ltd.; Irving Sabsevitz, president, Forrester Coal Co.; S. P. Vatcher, vice-president, V. Morrisdale Coal Mining Co.; F. D. Seymour, general sales manager, Berwind White Coal Mining Co.; William J. Tracy, president, M. J. Tracy, Inc.; R. E. Dennis, fuel agent, Consolidated Edison; George E. Owen, president, Imperial Coal Co.; P. H. Tuttle; G. E. Davis, Jr., assistant sales manager, Pittsburgh Consolidation Coal Co.; Paul O. Gunsales, division manager, New York Telephone Co., and E. W. Bratton, vice-president, Maust Coal & Coke Corp. Standing, left to right: H. A. Crichton, president, Johnstown Coal & Coke Co. of N. Y.; W. J. Duncan, district manager, Eastern Gas & Fuel Associates; E. T. Coene, vice-president, Seneca Coal & Iron Corp.; C. H. Loughridge, Jr., General Coal Co.; Harry Sammon, utilization manager, Consolidated Edison; and S. D. Zacharias, Jr., president, Wilmore Coal Mining Co.

netic and geologic data, will be published later.

This map is not available for sale or public distribution but may be examined at the office of the State Geologist, Room 108, 520 East State Street, Trenton 9, N. J.; Department of Geology, Room 101, Rutgers University, New Brunswick, N. J.; Geology Department Library, Guyot Hall, Princeton University, Princeton, N. J.; Public Library, 31 East Clinton Street, Dover, N. J.; Morristown Library, Morristown, N. J.; and the Geological Survey, Room 1033 (Library), General Services Building, Washington 25, D. C.

Mine Inspectors to Meet

The 42nd Annual Convention of the Mine Inspectors' Institute of America will be held June 9, 10 and 11. Headquarters for the convention will be the Sterling Hotel in Wilkes-Barre, Pa. Further information can be obtained from C. A. McDowell, secretary, 427 Park Street, California, Pa.

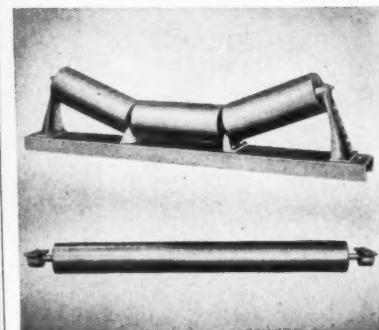
Iron Company Expands

Assets of the E. & G. Brooke Iron Co. have been acquired by the Colorado Fuel and Iron Corp. in exchange for common and preferred stock of C. F. & I.

The Brooke company will continue as a division of its new owner. Brooke and a wholly owned subsidiary operate a blast furnace in Pennsylvania and an iron ore mine in New Jersey.

APRIL, 1952

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ROBINS



Willis McG. Pierce discusses the duties of the President of AIME with his successor, Michael L. Haider

AIME Meets in New York

Record Attendance at Annual Convention

DURING the period from February 17 through 21 New York's Hotel Statler was the focal point for the more than 2300 members of the American Institute of Mining and Metallurgical Engineers who came to New York for the Institute's annual meeting. At the many technical sessions mineral industry educators, economists, operating men and scientists presented learned papers on every phase of the mineral industry.

One of the special features of the convention was the Welcoming Luncheon held in the Ball Room of the Hotel Statler. President W. McG. Pierce presided and introduced his successor, president-elect Michael L. Haider. Oliver B. Hopkins, president of the Canadian Institute of Mining and Metallurgy extended the greetings of that organization to those present. Featured speaker was Judge Harold R. Medina, who illustrated the points of his entertaining and thought provoking talk with some present day parables.

On Tuesday Augustus B. Kinzel, president, Union Carbide and Carbon Research Laboratories, Inc., presented the 29th Howe Memorial Lecture. This lecture has been delivered each year since 1923 by an individual invited to do so because of his outstanding achievements in ferrous metallurgy. Dr. Kinzel's subject was "Chromium Carbide in Stainless Steel."

Coal Division Meeting

The Coal Division's unusually extensive program, ten sessions in all, was marked by a Symposium on Gasi-



Judge Harold R. Medina supplied food for thought at the Welcoming Luncheon

fication and Liquefaction. With Dr. Arno C. Fieldner, USBM, as general chairman, this symposium began at the Wednesday morning session and continued through the afternoon and Thursday morning sessions. Every viewpoint and all experience to date was reviewed in the course of the discussion. Other sessions dealt with various phases of the mining, preparation and utilization of the nation's number one energy source.

Minerals Beneficiation Division

At ten sessions, extended over Monday, Tuesday, Wednesday and Thursday, new developments in milling equipment shared the spotlight with manganese conservation, materials handling, pyrolysis and agglomeration, and flotation theory and practice. Crushing and grinding from an operating and theoretical standpoint also

came in for serious study and discussion. The beneficiation of industrial minerals was the direct subject of four other papers.

The principal speaker at the Annual MBD Luncheon was Arthur F. Taggart, whose subject was "Education for Engineering." At that famous institution, the Scotch Breakfast, held on Wednesday morning, members of the division who were up in time enjoyed the fun, fellowship and oatmeal, etc., for which the event is noted.

Extractive Metallurgy

Copper, lead and zinc as well as more uncommon metals and the problems arising in their extraction were the topics claiming the interest of members of this Extractive Metallurgy Division. A round table discussing dealing with the training of metallurgists was led by a panel of experts from industry research and education including B. W. Gonser, J. C. Kinnear, Jr., B. M. Larsen, C. C. Long, R. R. McNaughton, W. O. Philbrook, R. Schuhman, Jr., and A. W. Schlechter.

Addition agents in electrometallurgy was the topic for a protracted session beginning Wednesday morning and continuing through four sessions until Thursday afternoon. Here too the round table discussion was the means of bringing out information not completely covered in the regularly scheduled papers.

Other Divisions Meet

In an ambitious program made up of fourteen sessions with papers representing the efforts of more than one hundred authors the Institute of Metals covered many of the newest developments in practical and theoretical metallurgy of nonferrous metals. The Iron and Steel Division with eight technical sessions heard papers on the problems of ferrous metallurgy which included a three session symposium on oxygen in steel making and joined the extractive metallurgists in considering the training of young men for the industry.

The Petroleum Branch of the institute in addition to taking active part in the geology and geophysics programs held two technical sessions, one on economics and one dealing with World Oil and Gas developments during 1951.

Lighter Moments

At the Annual Banquet on Wednesday evening presentation of the Robert H. Richards award was made to John F. Myers "for outstanding contributions to improvements in mineral flotation and grinding techniques and faithful service to his profession." The Mathewson Gold Medal went to Cecil G. Dunn, Fabian Lionetti, F. W. Daniels and Michael J. Bolton. The

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Robert W. Hunt award was given to Gerhard Derge, Wm. O. Philbrook and Kenneth M. Goldman. Wm. E. Bond received the J. E. Johnson, Jr. award and Donald A. Dahlstrom the Rosister W. Raymond Memorial Award.

Everette Lee DeGolyer was made an Honorary Member and 29 veterans were awarded the Legion of Honor pin to mark 50 years of membership in AIME.

Principal speaker of the evening, on the occasion of his taking over the presidency of the Institute for 1952, was Michael L. Haider. In his brief remarks, he pledged his utmost efforts to carry on the good work of his predecessors.

As is usually the case the Stag Smoker on Monday night reflected the hard work and good taste of the committee. The Informal Dance on Tuesday night was a complete success and the dancing and music which followed the Annual Banquet was enjoyed by all. Thanks are due the operators and manufacturers who were hosts at the Monday evening Cocktail Party.

Bluefield Show

The 11th annual Southern Appalachian Industrial Exhibit will be held in Bluefield, W. Va., May 14-16.

J. B. Wooldridge, Jr., assistant secretary of the Pocahontas Operators Association of Bluefield, is director of the show and S. S. Cooper, chief electrician of the American Coal Co., is general chairman. The exhibit is sponsored by the Pocahontas Electrical and Mechanical Institute, which is made up of men in the bituminous coal industry in southern West Virginia and southwest Virginia.

Queen Bituminous XI, a lovely coal field girl, will reign over the show decked out in attractive synthetic fabrics made from coal. She will be attended by a "court" made up of other young ladies. Additional features will be the Pioneer Miners' reunion, made up of men who have worked in the mines for 50 years without a lost time accident and a "gadget contest" in which men of the industry show homemade inventions which have been adapted to work in the mines.

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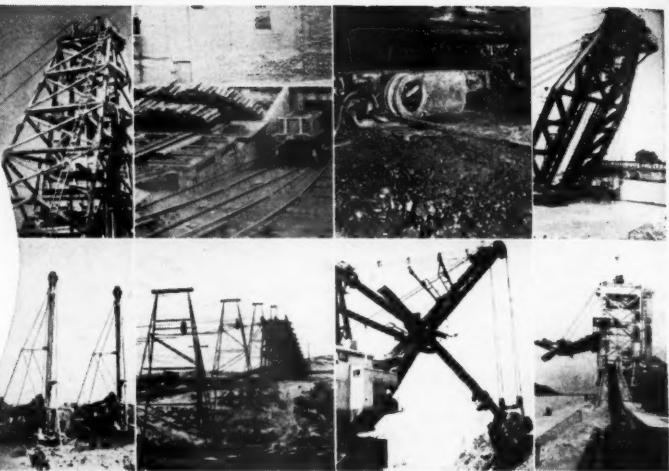
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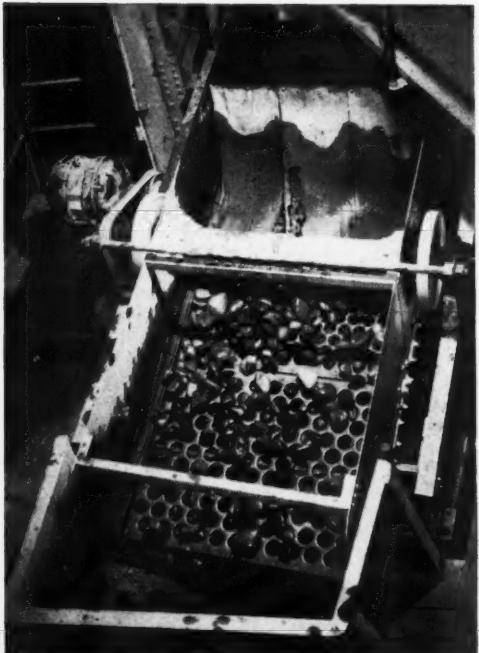
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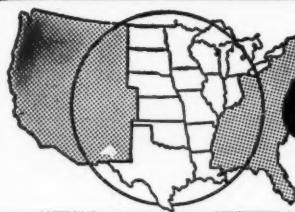


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Central States

Purchase Tri-State Mine

One of the Tri-State district's major mining companies, C. K. and E. Mining Co., has been purchased by the Helen H. Mining Corp. Properties involved in the purchase are the adjoining Stebins and Karcher leases, both in Kansas, northwest of Picher, Okla. Combined they cover 480 acres. The C. K. and E. is an important producer in the district field.

Soft Lime Company

The Lily White Lime Co.'s plant and quarry, near Rogers, Ark., were sold to Williams S. Branttington of Ponca City, Okla., according to a recent announcement. In the future the business will be operated as the Rogers Lime and Material Co.

A rock crusher with capacity of 800 tons per day, and a 50-ton hammer-mill has been installed at the quarry.

Announce Michigan Copper Project

In late February the General Services Administration formally announced an agreement with the White Pine Copper Co., a subsidiary of Copper Range Co., which will increase domestic output of copper 36,000 tons annually. The copper is to be produced from the White Pine located in Ontonagon County, Mich.

Proceeds of an RFC loan will be used to develop the orebody, to build necessary facilities for producing copper, a townsite, a railroad and a power plant.

Erect Iowa Steel Mill

Ground was broken early in March at Clinton, Iowa, for that state's first steel mill, which is expected to produce a million tons of iron and steel annually from low-grade Minnesota ore. The multi-million dollar plant will supply iron, coke and steel for midwest industries. Some production is expected before the end of 1952. Ore for the mill will be hauled from the Iron Range by rail to a new Mississippi River terminal south of St. Paul, from whence it will move downstream by barge to Clinton.

The steel mill and new river terminal will be erected by North American Steel Co., an Iowa corporation

headed by C. A. DePue, who is also president of Central Steel Co., of Clinton. Construction will be done entirely with private funds. A certificate of necessity for construction of the plant was approved February 29 by the Defense Production Adminis-tration.

At first the plant will primarily produce iron and coke, but it will be expanded to make it a fully integrated steel mill. The initial production goal will be 750,000 tons of pig iron and the same amount of coke annually. There will also be a modern bar and billet mill for rolling steel. In addition to Minnesota ore and some higher grade ore from the south, the plant will use midwestern scrap which is ordinarily shipped east.

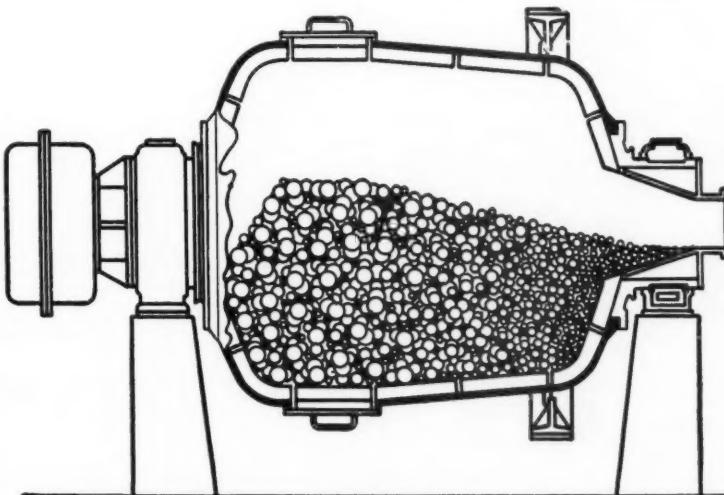
Slope Sinkers Celebrate

On February 3, Mine 10 of the Peabody Coal Co. celebrated the breakthrough of its new slope with a "Sinkers" party. Actual breakthrough took place January 12 when two sinking teams working in both directions met at about the 157-ft level.

Mine No. 10 is the first mine ever to be built with a slope entrance in the Illinois Midland field. It will eventually produce 13,200 tons per day from the No. 6 seam. The new slope will be 1518 ft long, when completed, and will house a conveyor belt which will transport coal to the surface at the rate of 1000 tph.

Estimate Taconite Reserve

Minnesota iron stocks are estimated to total more than 900,000,000 tons, with stocks of taconite estimated at 60 billion tons, the Minnesota state department of taxation has announced. The department also re-ported that although approximately 75,000,000 tons of ore were shipped during the 1951 season, 50,000,000 tons of new ore were discovered.



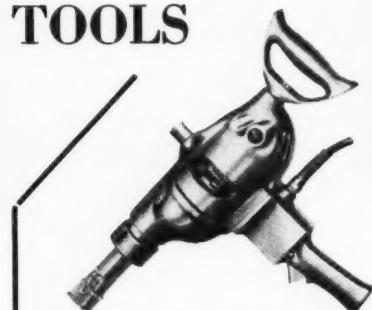
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From this 200-ft steel barge, shown being launched near New Orleans, Freeport Sulphur Co. will mine defense-essential sulphur in the Louisiana marshland at Bay St. Elain, La. It's the first marine project in the industry's history. The portable plant is designed to deliver an average of 1,750,000 gal of 325° F water per day 400 cfm of compressed air (500 psig), a power load of 800 kw and miscellaneous steam for heating sulphur lines and equipment. Each of the five water tube packaged-type boilers will have a capacity of 30,000 lb steam (400 psig) per hour.

MEG Will Hold Show

The mining electrical group, consisting of some 350 superintendents and suppliers interested in mine operations, principally coal, plan to hold their fifth show August 21, 22 and 23 at Franklin County Country Club, West Frankfort, Ill. One of the main

purposes of the exhibit is to acquaint the coal operators and mining personnel with all latest developments and technical progress in mining equipment. Some 160 exhibits of equipment and mining machinery are being arranged. The event is expected to attract several thousand persons.



Reports continue to come in on the drilling economies made possible by Intra-Set Steel. This tungsten carbide tipped steel speeds drilling—cuts bit costs—saves air and powder. Gauge sizes from 1 1/8" up—cross bit or chisel types—lengths up to 12 feet. Years of successful operation. You owe it to your business to get the Intra-Set facts. Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa.; 350 Depot St., Asheville, N. C.

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Iowa Lime Plant Operated

The McCarthy Improvement Co. recently put into operation its new hydrated lime plant at Lynwood, Iowa. This is the first such plant in the state of Iowa. Raw materials will be furnished from the Stone Products quarry, owned and operated by the McCarthy Co.

Hold BCR Conference

Executives of the coal, railroad and allied industries supporting the program of Bituminous Coal Research, Inc., met February 28 in Chicago to learn of coal research progress and to chart a course for future research and development leading to increased coal markets.

Progress was reported on projects leading to the development of a coal-fired gas turbine for locomotive use, new continuous mining machines, and improved equipment for coal utilization. Exhibits supplemented the progress reports in showing research advancements in residential heating equipment, coal-fired gas turbines, stainless steel belts for conveying coal, equipment for drying agricultural products, smoke abatement devices, and non-fuel uses of coal.

The officers of Bituminous Coal Research, Inc., elected were: A. A. Potter, president; H. J. Rose, vice-president and director of research; R. H. Sherwood, first vice-president; R. E. Salvati, vice-president; C. A. Reed, secretary; M. L. Garvey, treasurer, and J. F. Hanley, assistant secretary-treasurer.

To Boost Iron Ore Output

Reserve Mining Co. announced recently that it would expand its program of constructing plants and facilities for production of iron ore from taconite by 50 percent. Originally the program called for facilities to produce 2,500,000 tons of the concentrated ore and is scheduled for completion in 1955. A production of 3,750,000 tons will be possible with the new expansion.

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Steel Corp., both partners in Reserve, are building new blast furnaces. The addition of these new furnaces makes it desirable for them to secure additional ore by expansion of the Reserve project rather than from other mining sources.

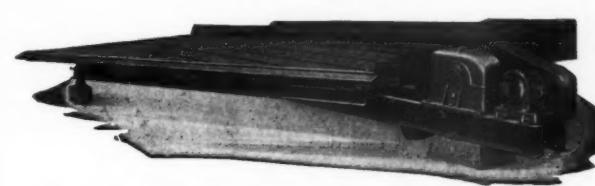
Reserve recently started construction of the 2,500,000-ton Lakeside project near Beaver Bay on Lake Superior about 55 miles east of Duluth. Meanwhile a much smaller production plant of 300,000-ton capacity at Babbitt, Minn., adjacent to the ore body, will be completed in the next few months.

Go on 48-hr Week

Miners at the Homestake gold mine, Lead, S. D., went on a 48-hour week March 2, according to general manager, Guy N. Bjorge. They were on a 42-hour week before the change.

Ore Royalties Up

Minnesota's income from iron ore royalty taxes increased more than a half a million dollars during the last half of 1951, over that of the same period in 1950, reports Stafford King, state auditor.



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As a result, the SuperDuty leads the field with capacity and performance records that can be checked and double checked in hundreds of installations. Write for Bulletin 119.



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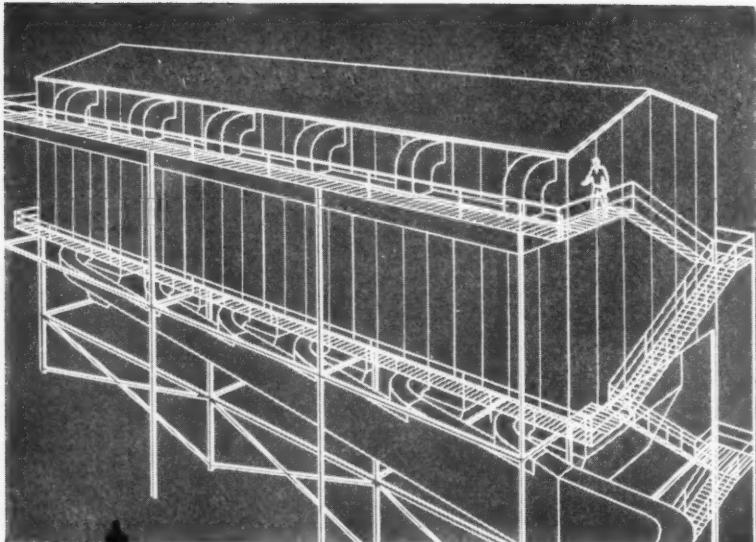
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Good Neighbor

One of the first to send a check to the Deadwood, S. D., Chamber of Commerce following a recent disastrous fire there in the business district, was the Homestake Mining Co., through Guy N. Bjorge, general manager. He sent a \$500 check to be used "in rebuilding a better Deadwood."

Wheels of Government

(Continued from page 75)
mittee, following the conclusion of hearings on February 21.

Mining Law Revision

A bill introduced by Representative Regan (Dem., Tex.) which would take sand, stone, gravel, pumice, pumicite, and cinders out from under the mining laws and permit their disposal, when situated in national forests, by the Secretary of Agriculture, was the subject of hearings before a House Mines and Mining subcommittee on March 19. The hearing was brief.

As Director Marion Clawson of the Bureau of Land Management opened the proponent testimony on the Regan bill, Representative Clair Engle (Dem., Calif.) vigorously attacked the measure as a further attempt "to take another bite out of the mining laws." Engle charged that the Department of Interior, failing to get complete repeal of the mining laws, sought their "piecemeal defeat" because it "would perhaps be more effective over the long haul than one lethal blow."

The doughty Californian also criticized a bill by Representative Cooley (Dem., N. C.), now before the House Committee on Agriculture, which he charged was "one more attempt to put the mining industry of this country out of business."

Under Engle's attack further consideration of the Regan bill was suspended until Director Clawson submits new language to stop abuse of the mining laws in the national forests. Representative D'Ewart (Rep., Mont.) emphasized that abuses of the mining laws come about because of laxity on the part of the Department in administration of the provision that a mining claim cannot be patented unless there is mineral in paying quantity, or commercial quantity. Clawson took the position that this provision is "too cumbersome, too time-consuming, and too expensive to the Government."



Leadville Tunnel Finished

Final shots in the Leadville, Colo., tunnel were fired late in February as the \$2,000,000 project was completed. Well over two miles of tunnel and laterals lay behind the men who blasted out the last round, opening the underground area for drainage. Only cleanup work remains, including some timber replacement, grouting, and laying of concrete drainage pipe in ditches where the tunnel floor is fractured by crossing faults. Property owners of the drained area will pay royalties on minerals made accessible, produced and sold as a direct result of the project.

The Stiers Brothers Construction Co. of St. Louis spent 20 months driving 6600 ft before August, 1945, when the project was stopped. It lay dormant for five years until rising demands for metals led Congress to authorize funds to complete the work, which was started again in September, 1950 by the Utah Construction Co., of Salt Lake City. The contract with the firm was to be terminated immediately, according to J. H. East, Jr., regional director for the Bureau of Mines, and the cleanup work will be completed by Bureau personnel.

East said that exploration for new ore reserves has been undertaken by the Cadwell Mining Co. in the Hayden shaft workings, which the tunnel tapped and drained. Similar work is planned by other operators now that the tunnel is completed.

Safe Mining Year

Nineteen-fifty-one was Wyoming's safest year of coal operations, with only three fatalities reported. The Reliance Mine No. 7 of the Union Pacific Coal Co. completed its fourth year without a lost time accident.

Anaconda Receives Award

In mid-February the Anaconda Copper Mining Co. received the outstanding citizen award and plaque presented annually by Damon Lodge No. 1, Knights of Pythias, to an individual or organization for outstanding public service to Butte, Mont. The citation and plaque, presented for the year 1951, were received on behalf of the Anaconda

Copper Mining Co. by E. S. McGlone, vice-president in charge of western operations of the company.

The citation termed operations of the Anaconda Co. as the primary industry in the community, and commended the company for its contributions to the community, donation of the ground for the new Civic Center, institution of the Kelley mine project to insure Butte's future and presenta-

tion to the people of Butte of the \$4,400,000 Community Memorial Hospital.

This was the fifth annual presentation of the citation by the Damon Lodge. The 1950 plaque of citation went to the Butte Miners' Union.

Complete Carlsbad Shaft

On February 15 the No. 4 Shaft of the Potash Division, International Minerals and Chemical Corp. was completed. All guides were in place, the shaft cleaned, and all installations of the station had been made. The shaft is now ready for use when operations are extended to that area.

The 854-ft shaft will be used for hoisting men and materials only. Shaft sinking was done by Utah Construction Co.

Mining's Greatest Show

DENVER'S newly remodeled auditorium will house the 1952 Metal and Nonmetallic Mineral Mining Convention and Exposition from September 22 through September 25. Fully one-third larger than any previous Western show, this year's exhibition will be the Mecca for thousands of mining executives and operating men from every corner of the country. Within the auditorium's spacious halls and overflowing onto two large parking lots will be shown every kind of mining and milling machinery, equipment and supplies. Each exhibit will display the latest the manufacturer has to offer. The time spent in careful examination of the exposition will provide a liberal education in what is new and what is best for the drilling, blasting, loading, haulage, hoisting, beneficiation and auxiliary operations of a modern metal or nonmetallic mineral mine.

Electricians, drill runners, motor operators, truck drivers, their foremen and supervisors, etc. . . . will have an unparalleled opportunity to see, examine and discuss with manufacturers' representatives, the machines they use and the methods employed to turn out all the metals and minerals needed to support our complex economy. Items on display will range from tiny screws to mammoth trucks; and earth-moving equipment. From the least spare part to the biggest unit, manufacturers and suppliers are cooperating to make this the best American Mining Congress Convention and Exposition ever.

The quality of the exposition will be matched by that of the papers delivered in the meeting rooms. All the important problems faced by operating men and management will be reviewed by outstanding authorities and those who attend will go away enriched by what they see and hear. Together the Convention and Exposition will comprise a postgraduate course in mineral industry problems that no mining man can afford to miss.

When the thousands of convention-goers descend on Denver, the city's facilities will be bursting at the seams. Better make reservations early. Write, wire or telephone to Denver Convention and Visitors Bureau, 225 West Colfax Ave., Denver, Colo.

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MINE locomotives and shuttle cars withstand hard usage because they are of high-strength steel construction. Why not give them storage batteries of the same construction?

In EDISON Nickel-Iron-Alkaline Storage Batteries, steel cell construction brings you high strength to withstand abuse and prevent down-time.

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Yet you get all these advantages at no extra cost. On the contrary, EDISON Nickel-Iron-Alkaline Storage Batteries are so long lived that

they effect substantial savings in annual depreciation charges. They are so trouble-free that they cut maintenance costs too. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.



Cut away view of a typical cell used in batteries for mine haulage. High-strength steel construction is used in all cells.

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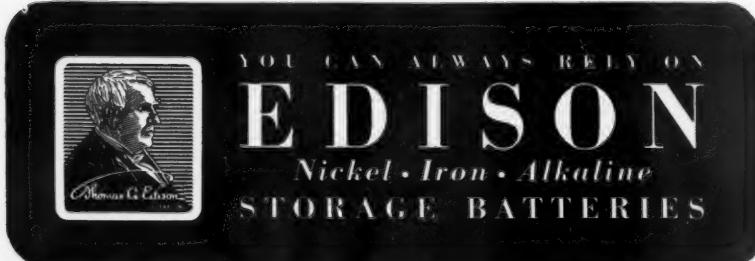
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Lead At Grizzly Mine

A strike of galena ore in the lower levels of the Grizzly mine, west of Silver Plume, Colo., has been reported by Ellis Lupton, owner of the mine. His was the first mine in the west to receive a grant from the Defense Minerals Administration. Lupton said the discovery could not have been made without the \$40,000 grant given him six months ago, which he matched with an equal sum.

Exploration work has been going on in the mine for two years. The strike was made early in February after a 1400-ft tunnel had been driven to the vein. Further exploration along the strike is now being carried on.

N. M. Miners Plan Meeting

President John A. Wood has announced that the 1953 Annual Convention of the New Mexico Mining Association will be held in Albuquerque January 22, 23 and 24. Headquarters for the convention will be the Alvarado Hotel.

Arrangements are already in progress to make this the most outstanding meeting ever held by the Association.

"Approximately 750 representatives of the mineral industry from the southwest are expected to attend the meeting," Wood said.

Reopen Amador Mine

The Amador copper mine, near Superior, Mont., reopened early in February under a Defense Minerals Administration loan. Discovered in 1889, the mine was actively developed in 1900. A smelter was started in 1905 and completed in 1907, but the mine closed during the panic of that year and has not operated since.

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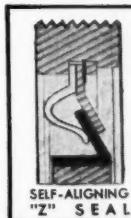
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PARIS MANUFACTURING COMPANY

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Nabob's New Strike

Nabob Mining Co. in the Pine Creek area in Idaho has cut a new vein of zinc-lead ore in its east end lower tunnel workings about 1400 ft deep from the surface and 600 ft west of the Sidney end line. The new discovery is apparently not in line with the Sidney vein system, although it is in that general area. It is south of the area heretofore prospected for the Denver vein, the western extension of Sidney, from which leasers are producing high grade mill feed for the Nabob milling plant. The new strike shows a four-ft width of zinc-lead ore.

Open Pits Replace Shafts

Lyman Fearne, Wyoming state mine inspector, reports that two new strip mines have replaced shaft mines at Elko and Rock Springs, Wyo. The changeover brings Wyoming strip mine production to 2,000,000 tons of coal, over 30 percent of the total. The largest strip operation in 1951 was at Elko by the Kemmerer Coal Co. In the new mine there an average of 4000 tons a day output was maintained.

Shaft mining in the state has declined since Kemmerer closed its shaft. Sweetwater Mine also converted from underground mining in Rock Springs to strip mining, and Burnell Coal Co. went out of business at Gebo. The number of mines declined from 34 to 32.

Unwater Golconda Shaft

After producing 2500 tons of silver-lead ore from Golconda ground and 2883 tons from adjoining Square Deal ground during 1951 Golconda Lead Mines Co. of Wallace, Idaho, has decided on a deep development program and has unwatered the old Golconda shaft down to the 1800-ft level. The new development is on the east side of a fault which apparently cut off the Golconda ore body in the early history of the mine.

New Idria Mine

California's New Idria quicksilver mine, reactivated in 1951, has again regained its former position as one of the leading quicksilver producers in the country. The plant is treating 100 tons of cinnabar daily, 65 men are employed, and the management plans to increase operations if more skilled miners can be hired. All production is from underground workings.

Rehabilitated workings include the 500-ft level, 1000-ft level and intervening stopes. The property is owned and operated by Idria Mining & Chemical Co. It was operated on a major scale during World War II and produced more mercury than any other mine in the country except the New Almaden.

Hold Mining Conference

The 25th Annual Conference of the Mineral Industry Institute was thrown open to the public late in February. Sponsored by the School of Mineral Engineering of the University of Washington, the Conference attracted a large number of mining executives from the region.

Dean Harold D. Wessman of the College of Engineering gave the welcoming address. The afternoon program included talks on radioactive raw materials, aluminum industry raw materials, ceramic minerals, minerals of British Columbia, and the present copper situation.

Park Utah Adds Pumps

Park Utah Consolidated Mines Co. plans addition of pumping equipment to take care of any increased water flow at the Ontario operation in the Park City district, according to Paul H. Hunt, vice-president and general manager. A core drill hole is being sunk from the surface near the No. 3 shaft to the 1500-ft level to carry the electric power lines for the additional power uses rated at 1350 kw.

Water is now being pumped at the rate of 600 to 800 gph from the 1700-ft level to the 1500-ft level, where it goes out the drain tunnel. The new equipment is being added to handle

water from expanded workings deeper in the Ontario mine.

Other progress includes retimbering the west portions of the Star of Utah tunnel in New Park Mining Co. ground being readied under agreement with New Park to serve as an entrance into Naildriver Mining Co. ground. The Naildriver, in which Park Utah is a large stockholder, will be the scene of a search for lead-zinc-silver ores once the tunnel has been rehabilitated.

Deepen Moore Shaft

The Coronado Copper and Zinc Co. expects to start soon on its proposed deepening of the Moore Shaft at Johnson Camp, which is 6½ miles north of Dragoon, Cochise County, Ariz.

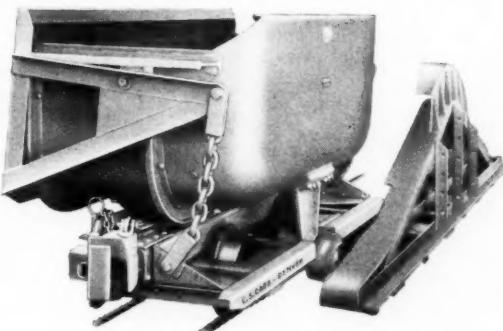
The Moore Shaft was sunk three years ago to a depth of 390 ft and then deepened 200 ft after the mine was reopened in June, 1950. Present plans call for sinking an additional 200 ft from the 500 to the 700-ft level.

The company is also constructing nine new frame houses for employees. Coronado is employing close to 150 men in mining and milling operations and producing approximately 6000 tons of copper-zinc ore monthly.

Fred E. Gray, Dragoon, Ariz., is mine manager.

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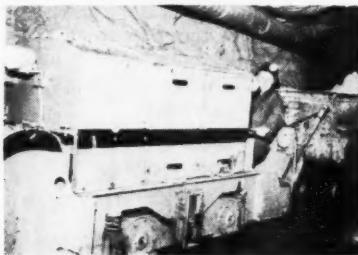


Manufacturers Forum

Use Diesel Locomotive

The Mancha Storage Battery Locomotive Division of Goodman Manufacturing Co., Chicago, Ill., is now offering diesel powered locomotives for use in metal mines and tunnels.

Illustrated here is a four-ton unit powered by a 45-hp engine which



drives through a torque converter. Running speeds are from 3½ to 7½ mph depending upon the drawbar pull demand. This locomotive is operating in an eastern base metal mine on 24-in. gauge and has over-all dimensions of 42 in. wide, 55 in. high and 9 ft 4 in. long.

Exhaust gases are effectively conditioned by a water scrubber to prevent causing any discomfort to underground personnel. Particularly careful attention is given to specific underground requirements in the design of diesel units.

Offer Locker Basket

More efficient use of space, more light, better ventilation and economy of installation are the outstanding features of the Moore Overhead Lockerbasket according to the manufacturer. This method of overhead storage of personal effects has been designed for use wherever people need a safe method of storing clothes, etc.

The basket is sturdy, rust resistant and will not tip. Garments are suspended back to back on hooks, thus allowing free circulation of air, and preventing contact with clothes of adjoining baskets. The hooks have this unusual feature: as part of the hanger itself, they are connected with eye bolts to the basket. The basket slides up and down on the long shanks. Thus, clothes suspended from the hooks will not slip off nor can they

be knocked off since the weight of the basket and its contents hold them securely in place. In addition to these features, the Moore Lockerbasket complies with all state laws and recommendations of the U. S. government.

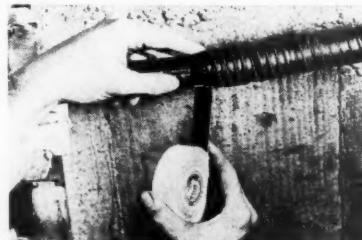
Complete plans for installation, along with complete details are available from the Moore Co., 422 Professional Building, Charleston, W. Va.

Improve Insulating Tape

A new oil-resistant tape for rapid insulation build-up on splices in large power cables has been announced by Minnesota Mining and Manufacturing Co., 900 Fauquier Street, St. Paul, Minn.

Designated "Scotch" brand electrical tape No. 25, it is made of synthetic rubber providing greater dielectric strength and resistance to high temperatures than natural rubber tapes.

The chemical-resistant qualities of the tape make it especially suitable for use in oil drilling, mining and underground cable operations, while the 40-mil thickness and extreme



stretch (1500 percent breaking point) make possible smooth insulation wraps on irregular surfaces.

Dielectric strength is 15,000 v. unstretched, and 10,000 v. at 500 percent elongation. It has an electrolytic corrosion factor of 1.0 and an insulation resistance of 100,000 megohms.

The tape is available in 3/4-in. by 15-ft rolls, is green-colored, and has a white stripable liner to be removed before use.

Since it fuses to itself, forming a solid homogeneous mass, it requires no adhesive. The tape is not designed as a sole insulation. "Scotch" plastic electrical tape No. 33 is recommended as the outer wrap for protection

against moisture, weather, and abrasion.

New "Payloader"

The Frank G. Hough Co., 846 Seventh St., Libertyville, Ill., has made available another four-wheel drive "Payloader" tractor-shovel. It has a one-cu yd bucket with 60 hp diesel or 54 hp gasoline power optional. The use of large pneumatic tires, same size all around, and drive on all four wheels gives this new "Payloader" tremendous traction and flotation to work effectively in sand, mud and snow and travel on paved



ments without injuring the surface. Rear wheel steer with power booster plus short wheel base makes it easy to operate and highly maneuverable. Four speeds in both directions insure fast travel speeds for transport and fast operating speeds on shuttle loading or similar operations. Fingertip-controlled hydraulic power raises-and-lowers and dumps-and-closes the bucket.

A powerful automatic digging action independent of the forward motion of the "Payloader" is an inherent characteristic. Automatic quick tip back of the bucket is also provided so that heaped bucket loads can be retained without spilling and can be carried low for good machine balance and full operator visibility. Because the seat is located high and forward, the operator has fullest visibility of all operations. The twin hydraulic boom rams are double acting, also the ram that dumps and closes the bucket. Great down-pressure can be applied to the bucket to dig into hard formations, and positive, precise control of the bucket action is assured at all times.

Literature and further details can be obtained from the manufacturer.

New Type Hand-Held Power Saw

A hand-held power saw, now being marketed by the Wright Power Saw & Tool Corp., Stratford, Conn., is as accurate and easy to handle as a hand-saw, but up to 20 times as fast, the manufacturer says. Weighing 15 lbs, it operates from any 60 cu ft or larger air compressor and is Permissible. Unlike conventional chain or circular type, this saw drives twin reciprocating blades over a 4-in. stroke at 1500 strokes per minute, it is claimed.

Said to be especially useful for



heavy timber, there is no limit to the depth of cut, and the width is limited only by the length of the 21-in. blades. Because of the tooth design, it is equally effective for crosscutting, ripping or notching. Sawdust is thrown away from the operator and cannot clog or bind the blades. The blades are a safe distance away from the operator, so that no guards are required—a feature that permits an unobstructed view of the cutting line.

Other features said to contribute to the 90 percent time and labor saving reported by users are: blades can be changed in seconds; handle adjustable through 360 deg for cutting in any position; because of the simple rugged construction, the saw is virtually trouble-free; saw stops instantly when spring-loaded throttle is released; finest alloy steel blades; saw can be stripped down or assembled in three minutes; low air consumption; aluminum alloy and steel construction.

Explosionproof Motors

A completely new line of explosion-proof mining motors, conforming to the Bureau of Mines Schedule 2E, has been announced by General Electric's Small and Medium Motor Divisions.

Representing the results of a survey of mining personnel, the new line is available in ratings from 1/2-60 hp at 230, 250, 500, and 550 volts, with stabilized shunt, compound, or series windings. According to G-E engineers, the motors incorporate many special features for longer life and easier maintenance.

All frame sizes in the line utilize two-stud brush mechanisms. With this construction, the engineers said, all brushes are accessible through two

large handhole covers in the upper half of the commutator end shield, greatly facilitating inspection and brush replacement. Non-rusting cast bronze handhole covers with heavy integral lugs resist corrosion and require no special tools for removal. The motors also use a cable gland design which permits cable replacement without removing the end shield or working through the commutator access openings.

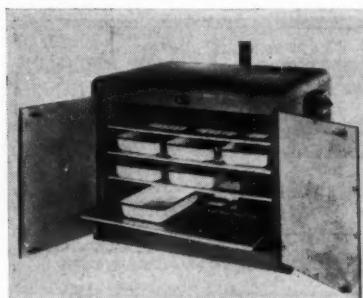
High dielectric insulation is applied to the coils with a vacuum impregnating process using Glyptal synthetic resins to insure maximum penetration. All windings are given a finish treatment of 1201 red Glyptal enamel which provides a moisture resisting insulation not subject to checking or peeling.

Standard motors are foot mounted, but modifications can be supplied for strap mounting, or with a face or flange end shield.

DECQ Introduces New Dryer

A new laboratory dryer, incorporating the latest features of design and precise control of temperature and circulation, has been disclosed by the Denver Equipment Co., Denver, Colo.

The compact, inexpensive dryer operates on single phase, 50-60 cycle, 110 or 220 v. ac. It has an asbestos air-cell insulated oven using a pair of standard, easily replaced heating elements. This insulation, combined with tight construction, keeps the heat in the dryer oven. Power consumption is low—generally less than five cents an hour. And since no heat escapes, the room is not made uncomfortably hot.



Proper humidity and drying conditions are maintained with a forced-air circulating damper on the back of the dryer. It has three stages of adjustment. The fan is driven by a motor mounted outside the dryer—away from high heat. Air is forced in and circulates over the elements. Moisture-laden air is discharged through specially located exhaust ports. An exhaust adapter is provided that can be connected to a three-in. stove pipe so fumes are kept out of the room.

Further information can be obtained on request to the company.

Announcements

The Tractor Division of Allis-Chalmers Manufacturing Co. reports plans for immediate construction of a new and modern factory branch at Independence, Mo. to serve agricultural and industrial dealers in eastern Kansas and western Missouri.

Hewitt-Robins Incorporated has purchased the outstanding stock of Korb-Pettit Wire Fabrics and Iron Works, Inc., it was recently announced by Thomas Robins, Jr., president of Hewitt-Robins. Korb-Pettit, with plants located in Philadelphia, Pa., is an important producer of woven wire fabric screen cloth, a component in Hewitt-Robins vibrating screening machinery.

CATALOGS AND BULLETINS

CAR RETARDER. *McNally Pittsburg Mfg. Corp., Pittsburg, Kans.* Bulletin No. 351 gives an engineering drawing of a typical air controlled, all steel car retarder installation. It also includes a written description of the complete unit along with a photograph and lists eight outstanding features of the unit. Bulletin No. 351 will be sent free upon request to the company.

DIAMOND CORE DRILL STANDARDS. *The Diamond Core Drill Manufacturers Association, 122 East 42 Street, New York 17, N. Y.* Bulletin No. 1 lists all the various types and sizes of core drill equipment in general use for which standards have now been written in whole or in part. The publication clearly shows these parts, with cutaway drawings and nominal dimensions. Copies may be obtained at a cost of 50 cents each from the above address.

MAGNETIC SEPARATORS. *Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 46, Wis.* A 12-page catalog briefly describing the company's entire line of magnetic separators and lifting magnets. The illustrated bulletin tells which magnets to use to remove iron from wet or dry materials carried on conveyor belts, as well as from chutes, ducts, etc. Units for magnetic concentration and purification, heavy media recovery and materials handling are also described. Copies may be obtained by requesting Catalog C-5000-B.

MINE HOISTS. *Nordberg Manufacturing Co., Milwaukee 7, Wis.* A 24-page bulletin 190 shows with installation photographs the application Nordberg Hoists have in coal and ore mining operations both in the United States and abroad. Descriptions of these installations give pertinent engineering data on the hoists' operation. Bulletin 190 is available, free upon request.

STANDARDIZED HEAVY MEDIA COAL CLEANING PLANTS. *Nelson L. Davis Co., Fisher Building, Chicago 4, Ill.* Describes the operation and gives detailed dimensions of the company's complete line of Standardized Heavy Media Coal Cleaning Plants. These plants, built in six sizes with capacities of 50 to 325 tph will clean coal within any size range between $\frac{1}{4}$ and 10 in. Ask for Book No. 151.

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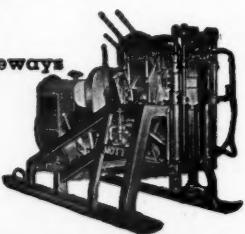
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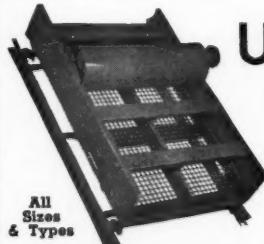
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Officials in an Armstrong Co., Pa. mine report that Kennametal Mining Machine Bits result in 37.5% more cutting per bit life as compared to other carbide bits that have been used. Total tonnage: with other carbide—3,126 tons, with Kennametal—4,994 tons. Service between bit changes was increased from 9 places to 14 places. Bit life was 37.5% longer.

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Gets Answer to
Power Problem**



Results of power test made for Mr. Claude Matthews, Supt., Moore Coal Co., Devonia, Tenn., show that Kennametal U-5-H Bits require

29% less power than steel bits. Test was made by a West Virginia consulting company. Particulars are: The machine using steel bits averaged a load of 52 H.P. on the motor while Kennametal averaged 37 H.P. or 29% lower average power. The machine which was rated at 50 H.P. operated at a 2 H.P. overload when steel bits were in service.

●
**Bit Cost Reduced to .58
cents per ton, Clymer
No. 2 Mine, Clearfield
Bituminous Coal Corp.**



J. F. Simpson, Mine Superintendent, says, "We have used Kennametal Bits for three years and they have cut 284 places per set." Prior to the use of U-7 Bits at the mine, complete bit changes or re-settings were made on each place that was cut. Bit cost averages only .58 of one cent per ton.

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**Booklet on Mining Bits
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New styles, sizes, prices and performance data on Kennametal Bits are available in new Mining Catalog M-6 published by Kennametal. You can have a copy by writing us and asking for it.

Duquesne Light Co.'s Harwick Mine

Reduces Cutting Cost



with Kennametal Bits



James H. Truax, mine superintendent, says, "We checked the performance of 100 Kennametal U-4 Bits and found that they gave a bit cost of \$.0026 per ton, which we consider very good." The cutting was done in a section of the mine where the coal was only medium hard to cut, and in other sections where it was more difficult, the U-7 was put on test. The record there, according to James Truax, was also satisfactory. He says, "The U-7 Bits have helped to make a difficult cutting job easier and more profitable." In this cutting, 14 places were cut between bit changes and 50 places were cut per set of bits.

Beside lowering bit cost, other advantages that are obtained by using Kennametal Bits are more efficient cutting because fewer stops are made to change or set bits, a large saving is also made on machine repair because the bits stay sharp and allow it to cut freer, and due to less changing and fewer dull bits, the cost of bit reconditioning is greatly reduced.

One of our service representatives who deals only in cutting and drilling problems will be glad to explain how Kennametal Bits can be cost-savers for you. Kennametal Inc., Latrobe, Pa.

The name of your nearest Kennametal representative can be found in your McGraw-Hill Mining Catalog. Contact him today.

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M·S·A RESPIRATORS

Protecting miners from dusts during operations such as drilling, cutting, and rock dusting is a big step forward in maintaining worker health, lowering accident frequency and increasing the production efficiency of the individual. The respirators featured here offer this vital safeguard and provide the wearing comfort that encourages full-time use.



M-S-A "COMFO" RESPIRATOR

Features new mineral wool twin filters that pass air freely—effectively trap harmful dust particles. The higher dust collecting efficiency of the maze of extra-fine fibers is unaffected by atmospheric conditions. Increased vision, comfortable dust-tight seal, quick filter change. U.S. Bureau of Mines Approved. Bulletin No. CR-26.



M-S-A DUSTFOE #55 RESPIRATOR

This compact, streamlined respirator offers the maximum in wearing comfort and protection. Users welcome its light weight (2½ oz.) and low breathing resistance. They have found too that the soft sponge facepiece cushion conforms to facial contours without uncomfortable pressure. The nylon filter holder permits normal downward vision. New "Static-Web" filter assures maximum protection against dusts. Small number of basic parts simplifies cleaning and maintenance. U.S. Bureau of Mines Approved. Bulletin No. CM-14.

M-S-A CHEMICAL CARTRIDGE RESPIRATOR

Equipped with a comfortable, gas-tight flexible rubber facepiece and twin replaceable, all metal cartridge filters, this compact respirator offers breathing protection against organic vapors such as acetone, gasoline, benzene and ether. Ideal protection in atmospheres where gases or vapors have a toxic effect after prolonged or repeated exposure. U. S. Bureau of Mines Approved.



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